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CANADA /ONTARIO FLOOD DAMAGE REDUCTION PROGRAM

REGIONAL FLOOD FREQUENCY ANALYSIS FOR ONTARIO STREAMS

VOLUME 3

(APPENDIX I)

SINGLE STATION FLOOD FREQUENCY ANALYSIS PLOTS AND TABLES INPUT DATA

1986

S.M.A. Moin and M.A. Shaw

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Water Planning and Management Branch

Inland Waters Directorate, Environment Canada

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I1.0 GENERAL

This volume presents the detailed results of the single station flood frequency analysis carried out on annual maximum peak flow data for 402 stations. Where possible, the data period was extended by combining the data for active stations with those for nearby discontinued stations on the same watercourse. For some stations included in the analysis, only annual maximum mean daily flow (MD), or a mix of MD and annual maximum instantaneous flow data (MID), were available. The latter data usually applied to the more recent records. Consequently the method described in section 4.1.3 (Volume 1) - Sangal's Method, was adopted to synthesize the MID data utilizing the maximum daily data. The flow data for three consecutive days including the MD as the middle value were utilized for this purpose. Missing data were estimated by correlation with data from similar drainage basins.

Statistical tests, described briefly in section 4.1.4 (Volume 1), were carried out on the database having over 9 years of records: nonparametric tests for independence, trend, homogeneity and randomness; and the Grubbs and Beck test for high and low outliers. Data were deleted or split into two periods (in a few cases) to satisfy the nonparametric tests and/or to reflect known changes in the flow regime for the drainage basin (eg. urbanization, regulation of flow, etc.). The edited data resulting after all these revisions were made are presented in Table I1.0 and the information on the composition and extent of the data used is shown in Table I1.2. A legend to the Water Survey of Canada station numbers for data used in the analyses is shown in Table I1.1.

Single station flood frequency analysis (FFA) was subsequently carried out on the samples having at least 10 years of annual peak flow data. Flow data for stations with 5-9 years of data were not analysed but have been included in Table I1.0 for information purposes. Several types of lognormal probability distributions were utilized in an attempt to achieve the best 'fit' to the data sample. The following computer programs were used in this analysis, according to the data peculiarities identified by the previous tests :

1) FDRPFFA -three parameter lognormal (3PLN) distribution for 'normal' data samples [A];
   -two parameter lognormal distribution (LN) for data having a large negative coefficient of skew (CS) (usually CS < -0.5) [C];

2) LOWOUT -conditional 3PLN distribution used for data samples having low outliers [B]; and,

3) ISTORIC -conditional 3PLN distribution utilizing censoring and high maximum likelihood theory, used for data samples having high outliers with historical information [D].

where: [A], [B], and [C] indicate the distribution used as shown in summary tables of FFA results - presented in Volumes 1 and 2.

The procedures employed for FFA are described further in Section 4.2 (Volume.1) and the detailed results are shown in Figures I1.0 to I402.0. Plots for several stations (02AD010, 02EA008, 02HC004 and 02JC009) that failed the nonparametric tests are included for general information only and should not be used for flood estimates.

The gauging station data were also reviewed in order to assess the effect of 'regulation' on flood flows. The degree of regulation was determined using the method described in section 4.1.5 (Volume 1) and a 'regulation classification' as follows was assigned to the station:

Class 1 (R1) indicates that regulation has a minor effect on flood flows;

Class 2 (R2) indicates that regulation has a moderate effect on flood flows;

Class 3 (R3) indicates that regulation has a major effect on flood flows; and,

Class 4 (R4) indicates that there are major watershed diversions in the drainage basin.

The drainage areas shown in the following tables are given in square kilometres and the symbols used and their meaning are shown below.

_1980 03 42.5_ indicates that data period was split at this point.

<1981 6 3.5> indicates that flow was regulated from this year.

ABITIBI RIVER AT ABITIBI CANYON 04ME002

DRAINAGE AREA : 22900.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1932 - 1992

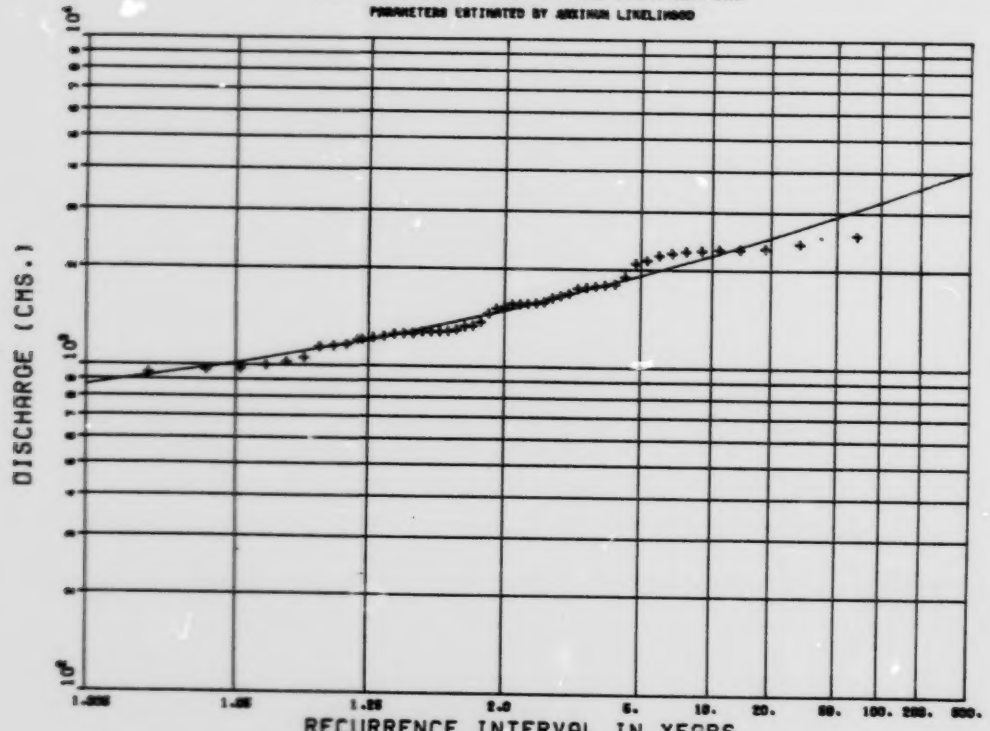
SAMPLE STATISTICS
MEAN = 1578. S.D. = 446.4 C.S. = .5835 C.K. = 2.4372
SAMPLE STATISTICS (LOGS)
MEAN = 7.3260 S.D. = .2771 C.S. = .1880 C.K. = 2.2341
SAMPLE MIN = 943. SAMPLE MAX = 2557. N = 51

PARAMETERS FOR GUMBEL I A = .002863 U = 1371.
PARAMETERS FOR LOGNORMAL M = 7.3260 S = .2771
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 685. M = 6.7738 S = .4747
STATISTICS OF LOG(X-A)
MEAN = 6.7738 S.D. = .4747 C.S. = -.1371 C.K. = 2.3827
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0260 B = .1132E+03 LOG(M) = 4.3777
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .7966E+02
A = .0800 B = .1219E+02
LOG(M)= 6.3584 M = .5727E+03
DISTRIBUTION STATISTICS MEAN = 7.3260 S.D. = .2794 C.S. = .5728

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	789.		744.		863.		857.		781.	
1.050	982.		963.		1010.		1010.		978.	
1.250	1227.		1280.		1190.		1200.		1200.	
2.000	1500.		1520.		1400.		1400.		1510.	
2.330	1570.	3.94	1600.	3.91	1560.	4.30	1560.	4.22	1560.	4.24
5.000	1900.	4.65	1920.	4.52	1910.	5.28	1900.	5.23	1910.	4.76
10.000	2160.	5.24	2170.	5.24	2210.	6.71	2200.	6.70	2180.	5.79
20.000	2410.	5.74	2400.	5.95	2510.	8.42	2510.	8.56	2430.	7.25
50.000	2730.	6.29	2690.	6.84	2920.	10.50	2930.	11.40	2760.	9.52
100.000	2980.	6.64	2890.	7.47	3240.	12.80	3270.	13.70	3010.	11.60
200.000	3220.	6.94	3100.	8.06	3580.	14.70	3630.	16.10	3260.	13.70
500.000	3540.	7.28	3370.	8.80	4040.	17.30	4140.	19.50	3600.	16.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ABITIBI RIVER AT ABITIBI CANYON 04ME002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 11.0

ABITIBI RIVER AT IROQUOIS FALLS 04MC001

DRAINAGE AREA 13300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD: 1920 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	725.	209.	-.138	2.546
LN X SERIES	6.54	.32	-.836	3.673

X(MIN)= 240. CMS. TOTAL SAMPLE SIZE= 67
X(MAX)= 1165. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

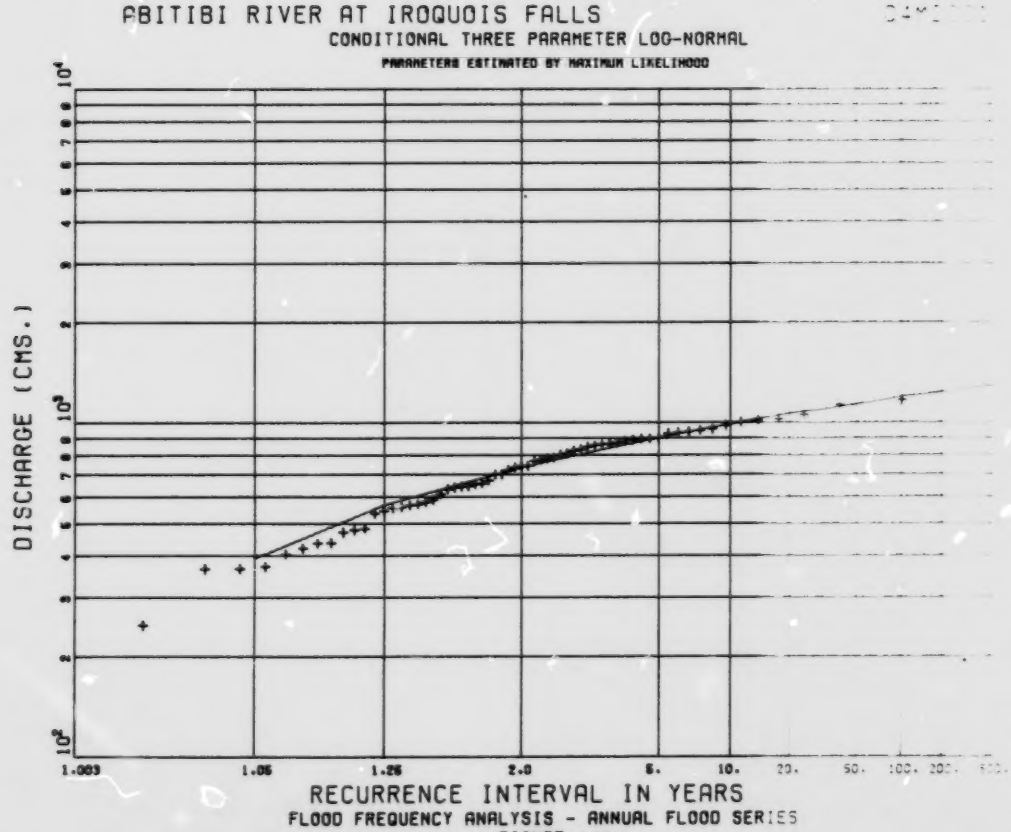
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	732.	202.	-.051	2.4[illegible]
LN X SERIES	6.56	.30	-.568	3.7[illegible]
LN (X-A) SERIES	8.73	.03	-.009	2.4[illegible]

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 6918.0123 M = 8.7295 S = .0326

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	392.
1.250	.800	566.
2.000	.500	732.
2.330	.429	768.
5.000	.200	901.
10.000	.100	987.
20.000	.050	1060.
50.000	.020	1130.
100.000	.010	1190.
200.000	.005	1230.
500.000	.002	1290.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I2.0

ABITIBI RIVER AT ISLAND FALLS 04ME001

DRAINAGE AREA : 20700.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1928 - 1967

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1363.	372.	-.371	3.279
LN X SERIES	7.17	.34	-1.941	10.548

X(MIN)= 315. CMS. TOTAL SAMPLE SIZE= 40
X(MAX)= 2017. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

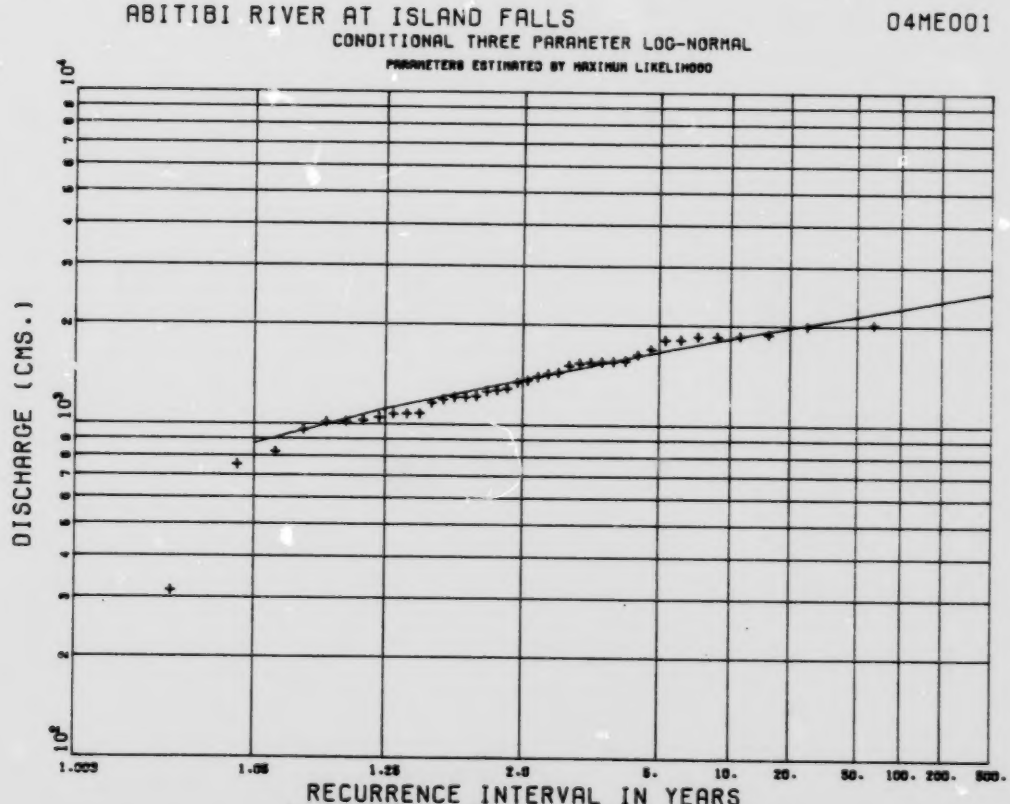
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1390.	335.	-.171	2.451
LN X SERIES	7.21	.25	-.279	2.796
LN (X-A) SERIES	7.92	.12	-.035	2.521

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -1373.7770 M = 7.9173 S = .1216

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.350	.952	870.
1.250	.800	1110.
2.000	.500	1360.
2.330	.429	1420.
5.000	.200	1660.
10.000	.100	1830.
20.000	.050	1970.
50.000	.020	2140.
100.000	.010	2250.
200.000	.005	2350.
500.000	.002	2520.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I3.0

ABITIBI RIVER AT ONAKAWANA 04ME003

DRAINAGE AREA : 27500.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1960 - 1982

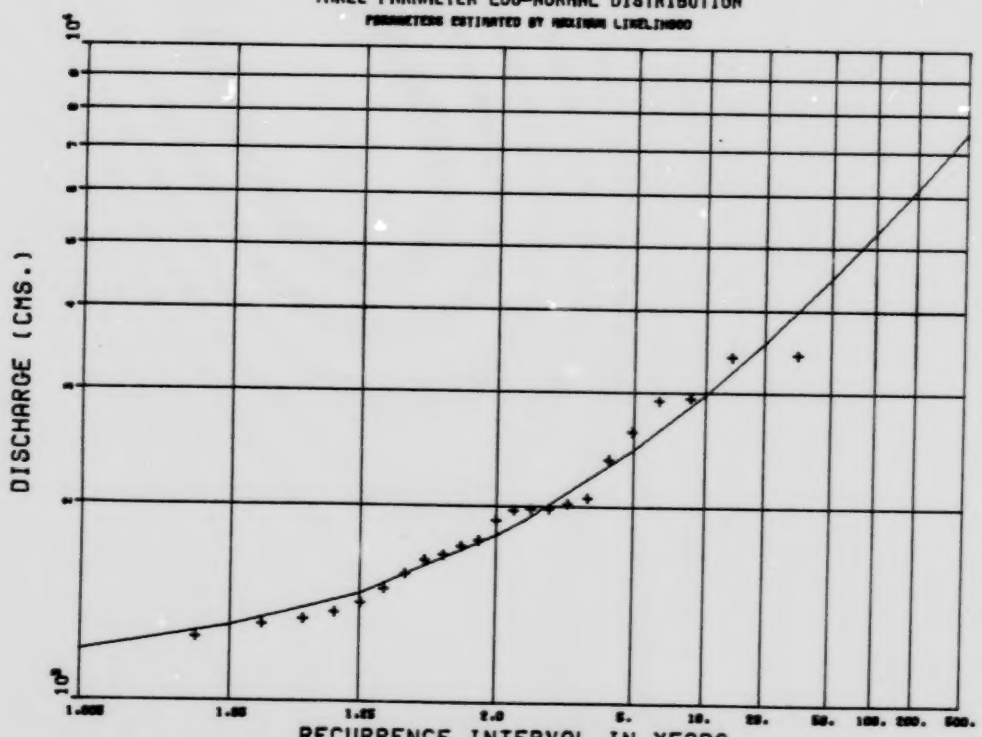
SAMPLE STATISTICS
MEAN = 2006. S.D. = 647.8 C.S. = 1.0146 C.K. = 3.6066
SAMPLE STATISTICS (LOGS)
MEAN = 7.5585 S.D. = .3010 C.S. = .5420 C.K. = 2.8770
SAMPLE MIN = 1250. SAMPLE MAX = 3420. N = 23

PARAMETERS FOR GUMBEL I A = .002205 U = 1723.
PARAMETERS FOR LOGNORMAL M = 7.5585 S = .3010
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1096. M = 6.5566 S = .7654
STATISTICS OF LOG(X-A)
MEAN = 6.5566 S.D. = .7654 C.S. = -.2349 C.K. = 2.7995
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0816 B = .1362E+02 LOG(M) = 6.4478
ME= .6313E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .2349 B = .1987E+01
LOG(M)F= 7.0919 M = .1212E+04
DISTRIBUTION STATISTICS MEAN = 7.5585 S.D. = .3311 C.S. = 1.4188

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	966.		883.		1190.		1220.		1030.	
1.050	1220.		1170.		1300.		1300.		1230.	
1.250	1510.		1490.		1460.		1460.		1400.	
2.000	1890.		1920.		1800.		1788.		1870.	
2.330	1990.	6.04	2020.	6.33	1900.	7.04	1880.	8.00	1970.	7.09
5.000	2400.	7.09	2470.	7.31	2440.	10.20	2410.	8.00	2440.	8.36
10.000	2740.	7.97	2820.	8.47	2970.	14.00	2970.	8.00	2860.	10.70
20.000	3070.	8.71	3150.	9.63	3570.	18.10	3630.	8.00	3280.	14.10
50.000	3490.	9.52	3560.	11.10	4490.	23.20	4700.	8.00	3870.	19.50
100.000	3810.	10.00	3860.	12.10	5270.	28.00	5700.	8.00	4340.	24.10
200.000	4120.	10.50	4160.	13.00	6150.	32.20	6910.	8.00	4850.	28.40
500.000	4540.	11.00	4560.	14.20	7480.	37.50	8910.	8.00	5580.	35.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ABITIBI RIVER AT ONAKAWANA 04ME003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 14.0

ABITIBI RIVER AT OTTER RAPIDS 04ME004

DRAINAGE AREA 9950.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD: 1962 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1679.	499.	1.491	7.300
LN X SERIES	7.39	.27	.540	4.495

X(MIN)= 1000. CMS. TOTAL SAMPLE SIZE= 22
X(MAX)= 3220. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1712.	467.	1.622	7.724
LN X SERIES	7.41	.26	.752	4.971
LN (X-A) SERIES	6.49	.61	-.131	3.527

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 927.4118 M = 6.4949 S = .6073

FLOOD FREQUENCY REGIME

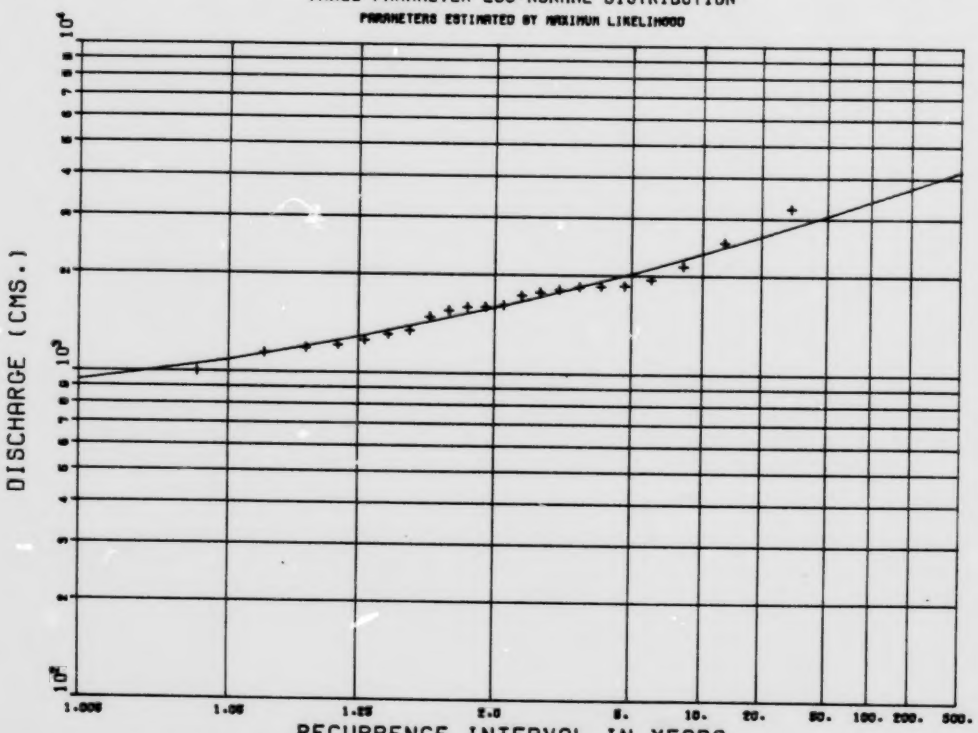
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.303	.997	-
1.050	.952	1170.
1.250	.800	1330.
2.000	.500	1570.
2.330	.429	1640.
5.000	.200	2110.
10.000	.100	2350.
20.000	.050	2700.
50.000	.020	3200.
100.000	.010	3620.
200.000	.005	4050.
500.000	.002	4690.

ABITIBI RIVER AT OTTER RAPIDS 04ME004

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 13.0

ABITIBI RIVER AT TWIN FALLS 04MC002

DRAINAGE AREA : 9950.8 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1950 - 1982

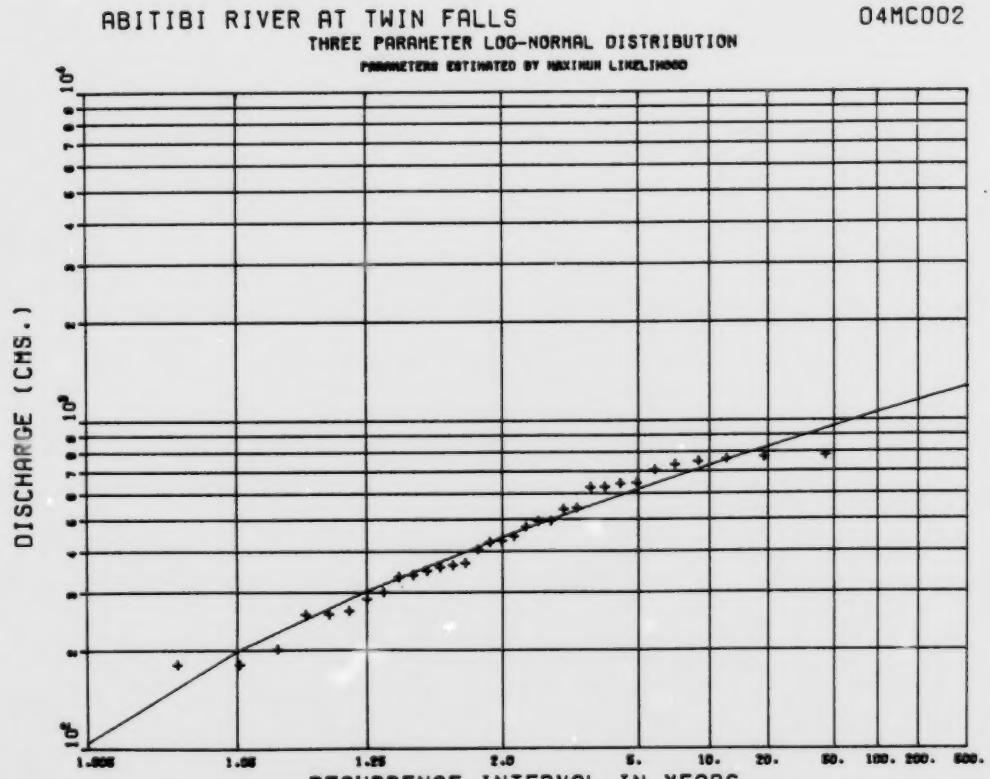
SAMPLE STATISTICS
MEAN = 465. S.D. = 187.4 C.S. = .2801 C.K. = 2.1824
SAMPLE STATISTICS (LOGS)
MEAN = 6.0554 S.D. = .4334 C.S. = -.3354 C.K. = 2.5253
SAMPLE MIN = 181. SAMPLE MAX = 781. N = 33

PARAMETERS FOR GUMBEL I A = .8E383 U = 375.
PARAMETERS FOR LOGNORMAL M = 6.0554 S = .4334
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -202. M = 6.4639 S = .2863
STATISTICS OF LOG(X-A)
MEAN = 6.4639 S.D. = .2863 C.S. = -.1E36 C.K. = 2.2774
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0727 B = .3555E+02 LOG(P) = 8.6395
ME= .5651E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	114.		140.		104.		0.		122.	
1.050	201.		209.		198.		0.		201.	
1.250	301.		296.		302.		0.		299.	
2.000	435.		426.		439.		0.		437.	
2.330	466.	7.42	461.	7.60	473.	7.62	0.	0.00	471.	8.10
5.000	610.	8.05	614.	8.78	614.	7.72	0.	0.00	617.	8.02
10.000	728.	8.66	743.	10.20	724.	8.84	0.	0.00	730.	8.85
20.000	841.	9.17	870.	11.60	825.	10.40	0.	0.00	833.	10.60
50.000	987.	9.72	1040.	13.30	953.	12.80	0.	0.00	959.	13.80
100.000	1100.	10.10	1170.	14.50	1050.	14.70	0.	0.00	1050.	16.70
200.000	1210.	10.30	1300.	15.70	1140.	16.60	0.	0.00	1140.	19.70
500.000	1350.	10.70	1490.	17.10	1260.	19.10	0.	0.00	1250.	23.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 16.0

ALBANY RIVER ABOVE NOTTIK ISLAND 04GD001

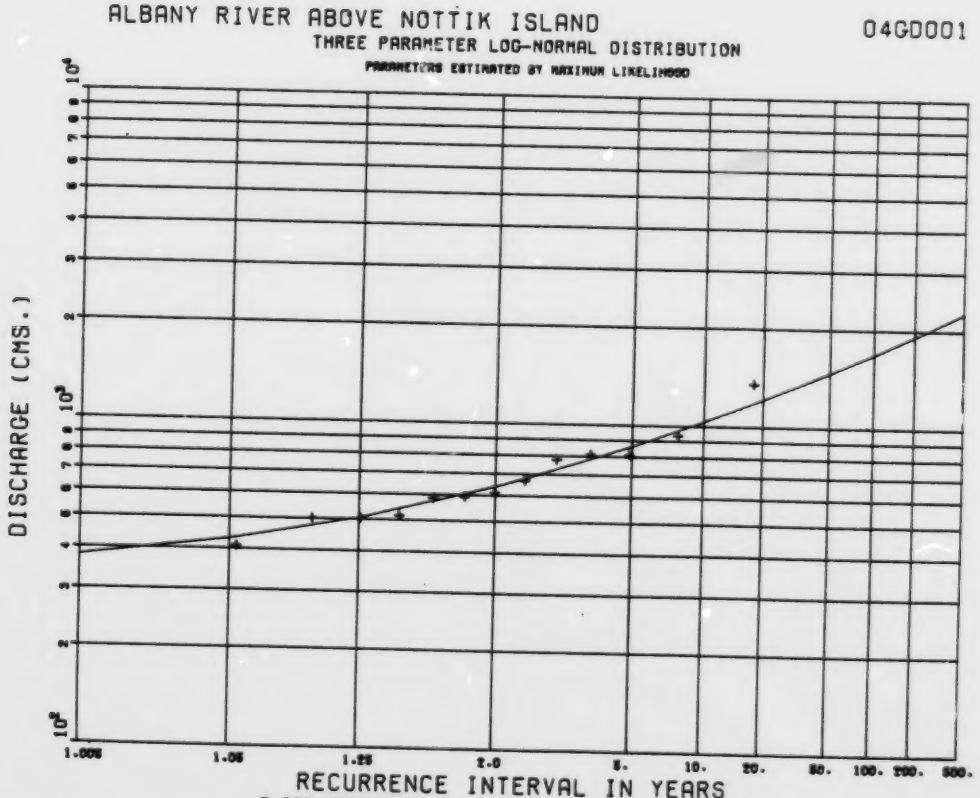
DRAINAGE AREA : 32400.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1967 - 1979

SAMPLE STATISTICS
MEAN = 638. S.D. = 248.1 C.S. = 1.5951 C.K. = 7.1350
SAMPLE STATISTICS (LOGS)
MEAN = 6.4977 S.D. = .3185 C.S. = .7307 C.K. = 4.6156
SAMPLE MIN = 408. SAMPLE MAX = 1350. N = 13

PARAMETERS FOR GUMBEL I A = .006152 U = 596.
PARAMETERS FOR LOGNORMAL M = 6.4977 S = .3185
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 312. M = 5.7788 S = .6209
STATISTICS OF LOG(X-A)
MEAN = 5.7788 S.D. = .6209 C.S. = -.0614 C.K. = 4.2077
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1164 B = .7492E+01 LOG(M) = 5.6260
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .2776E+03
A = .1350 B = .5301E+01
LOG(M)F= 5.7820 M = .3244E+03
DISTRIBUTION STATISTICS MEAN = 6.4977 S.D. = .3109 C.S. = .8687

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	325.		292.		378.		380.		361.	
1.050	415.		393.		429.		434.		423.	
1.250	518.		508.		504.		509.		505.	
2.000	655.		664.		636.		635.		639.	
2.331	690.	8.29	702.	8.90	674.	9.69	671.	9.89	676.	10.20
5.000	840.	9.68	868.	10.30	858.	12.70	843.	12.20	852.	12.30
10.000	962.	10.80	998.	11.90	1030.	16.70	1000.	16.10	1010.	16.10
20.000	1080.	11.80	1120.	13.50	1210.	21.10	1180.	20.80	1190.	21.70
50.000	1230.	12.90	1280.	15.60	1470.	27.40	1440.	27.60	1440.	30.80
100.000	1340.	13.60	1390.	17.00	1680.	32.10	1660.	33.10	1640.	38.50
200.000	1460.	14.10	1510.	18.40	1910.	36.80	1900.	38.90	1870.	46.70
500.000	1610.	14.80	1660.	20.00	2250.	42.90	2270.	46.90	2220.	58.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 17.0

ALBANY RIVER BELOW ACHAPI LAKE 04GC002

DRAINAGE AREA : 16300.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1971 - 1982

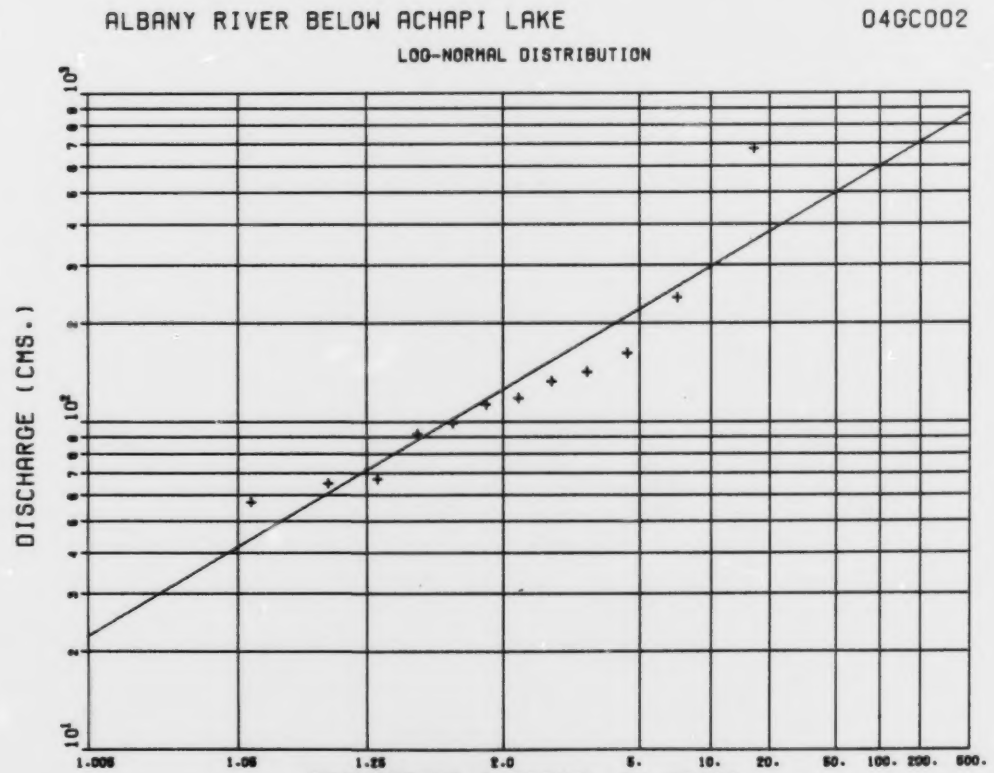
SAMPLE STATISTICS
MEAN = 164. S.D. = 169.2 C.S. = 2.9648 C.K. = 13.4175
SAMPLE STATISTICS (LOGS)
MEAN = 4.8304 S.D. = .6712 C.S. = 1.4547 C.K. = 6.3998
SAMPLE MIN = 57. SAMPLE MAX = 877. N = 12

PARAMETERS FOR GUMBEL I A = .013982 U = 109.
PARAMETERS FOR LOGNORMAL M = 4.8304 S = .6712
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 53. M = 3.9429 S = 1.3493
STATISTICS OF LOG(X-A)
MEAN = 3.9429 S.D. = 1.3493 C.S. = -.2609 C.K. = 4.6876
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .4882 B = .1598E+01 LOG(M) = 3.9075
ME= .4978E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-10.		22.		55.		0.		51.	
1.050	33.		42.		59.		0.		58.	
1.250	75.		71.		72.		0.		72.	
2.000	136.		125.		105.		0.		107.	
2.330	151.	17.40	141.	19.50	119.	21.80	0.	0.00	120.	26.30
5.000	217.	17.20	220.	22.60	214.	34.10	0.	0.00	199.	31.80
10.000	270.	17.70	296.	26.20	344.	49.00	0.	0.00	305.	42.60
20.000	322.	18.10	378.	29.70	528.	55.10	0.	0.00	459.	62.30
50.000	388.	18.70	497.	34.20	878.	67.10	0.	0.00	780.	97.90
100.000	438.	19.00	597.	37.30	1240.	75.20	0.	0.00	1167.	130.00
200.000	484.	19.30	706.	40.30	1720.	82.70	0.	0.00	1720.	164.00
500.000	554.	19.70	866.	44.00	2570.	91.50	0.	0.00	2910.	214.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 10.0

ALBANY RIVER NEAR HAT ISLAND 04HA001

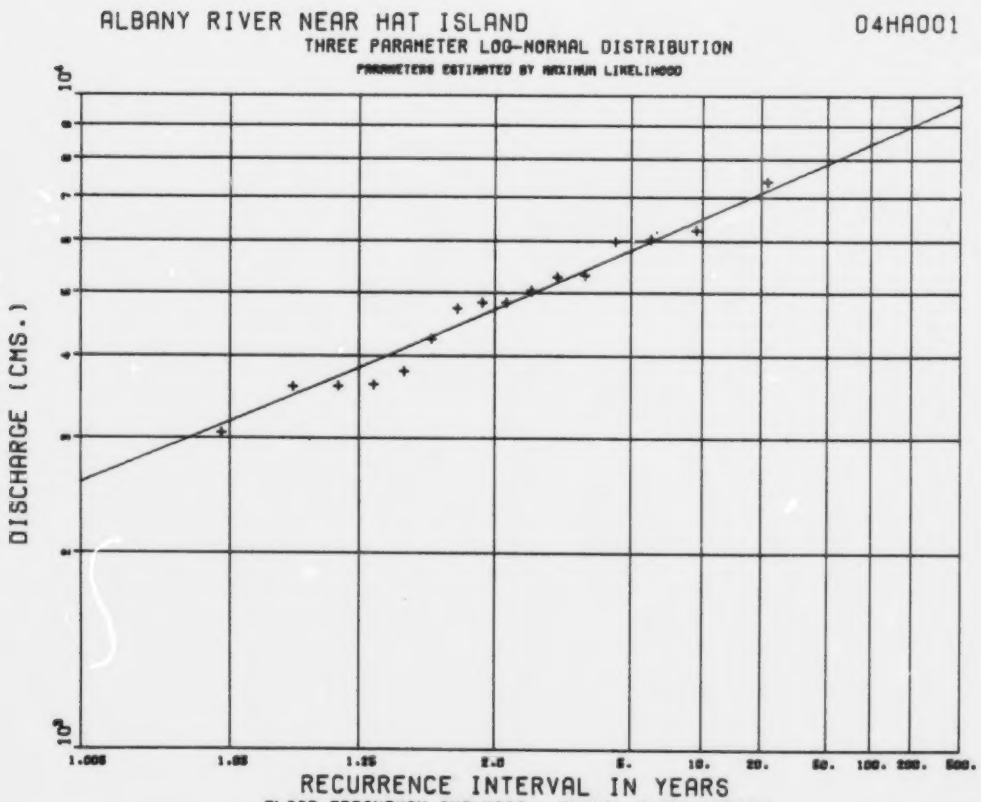
DRAINAGE AREA : 118000.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1967 - 1982

SAMPLE STATISTICS
MEAN = 4050. S.D. = 1181.9 C.S. = .4364 C.K. = 3.5017
SAMPLE STATISTICS (LOGS)
MEAN = 8.4588 S.D. = .2446 C.S. = -.0418 C.K. = 3.0242
SAMPLE MIN = 3050. SAMPLE MAX = 7396. N = 16

PARAMETERS FOR GUMBEL I A = .001028 U = 4300.
PARAMETERS FOR LOGNORMAL M = 8.4588 S = .2446
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 394. M = 8.3687 S = .2676
STATISTICS OF LOG(X-A)
MEAN = 8.3687 S.D. = .2676 C.S. = -.8834 C.K. = 3.0203
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0051 B = .2287E+04 LOG(M) =20.1552
ME= .5666E+09
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0117 B = .4108E+03
LOG(P)F=13.2566 M = .5718E+06
DISTRIBUTION STATISTICS MEAN = 8.4588 S.D. = .2376 C.S. = -.0988

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	2680.		2510.		2560.		2510.		2490.	
1.111	3220.		3150.		3170.		3170.		3140.	
1.250	3540.		3840.		3830.		3870.		3840.	
2.000	4660.		4720.		4700.		4730.		4720.	
2.327	4860.	6.35	4930.	6.16	4910.	6.59	4940.	6.38	4930.	6.51
5.000	5760.	7.67	5820.	7.32	5790.	7.26	5730.	6.75	5810.	7.37
10.000	6490.	8.67	6450.	8.25	6470.	8.70	6370.	7.78	6430.	8.25
20.000	7190.	9.57	7050.	9.38	7090.	10.60	6920.	9.42	7030.	10.10
50.000	8100.	10.60	7790.	10.80	7860.	13.50	7540.	12.20	7750.	13.10
100.000	8780.	11.20	8330.	11.80	8430.	15.90	8040.	14.60	8270.	15.70
200.000	9450.	11.80	8860.	12.70	8980.	18.20	8500.	17.20	8770.	18.50
400.000	10300.	12.40	9540.	13.90	9710.	21.40	9070.	20.70	9420.	22.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 19.0

ALDER CREEK NEAR NEW DUNDEE 02GA030

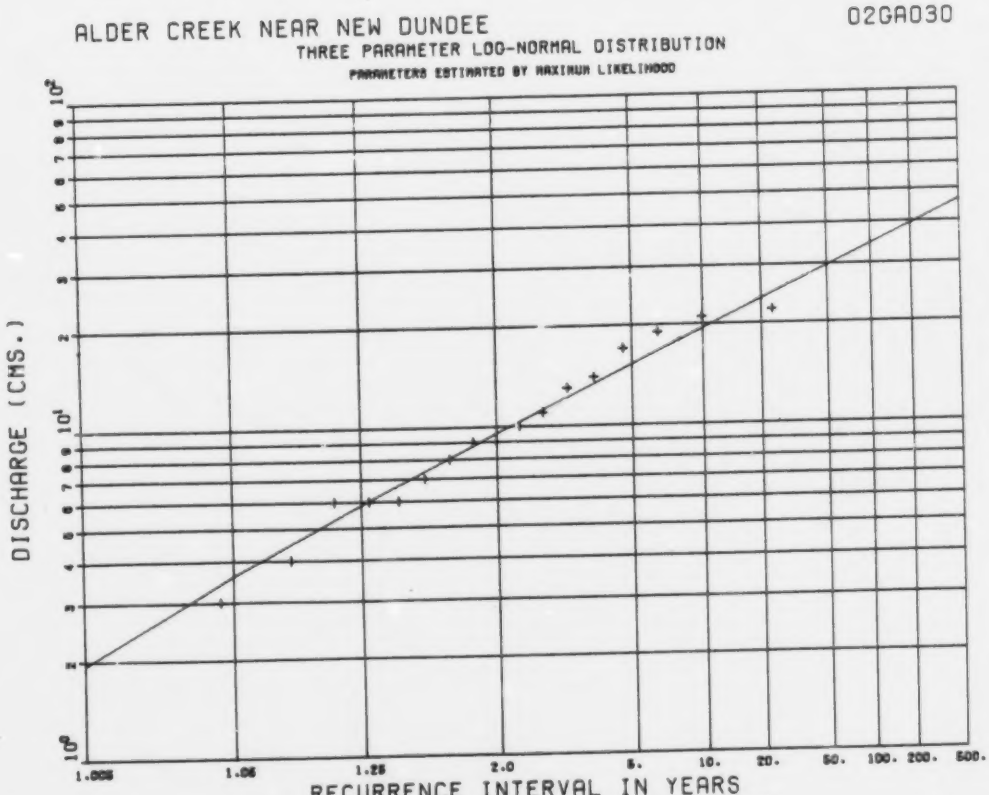
DRAINAGE AREA : 49.7 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1966 - 1982

SAMPLE STATISTICS
MEAN = 11. S.D. = 5.9 C.S. = .6755 C.K. = 3.0000
SAMPLE STATISTICS (LOGS
MEAN = 2.2410 S.D. = .5736 C.S. = -.2358 C.K. = 3.1228
SAMPLE MIN = 3. SAMPLE MAX = 22. N = 17

PARAMETERS FOR GUMBEL I A = .225617 U = 8.
PARAMETERS FOR LOGNORMAL P = 2.2410 S = .5736
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 2.3180 S = .5307
STATISTICS OF LOG(X-A)
MEAN = 2.3180 S.D. = .5307 C.S. = -.1504 C.K. = 3.0116
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0676 B = .7197E+02 LOG(M) = 7.1068
ME= .1220E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2028 B = .8017E+01
LOG(M)F= 3.8672 M = .4781E+02
DISTRIBUTION STATISTICS MEAN = 2.2410 S.D. = .5743 C.S. = -.7063

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		2.		2.		1.		2.	
1.050	3.		4.		4.		3.		4.	
1.250	6.		6.		6.		6.		6.	
2.000	10.		9.		10.		10.		10.	
2.330	11.	12.60	10.	14.00	11.	14.40	11.	13.90	11.	15.00
5.000	15.	13.00	15.	16.20	15.	15.60	15.	13.00	15.	15.20
10.000	18.	13.70	20.	18.80	19.	18.50	19.	13.10	19.	17.10
20.000	21.	14.20	24.	21.30	24.	22.00	21.	14.10	23.	20.60
50.000	26.	14.80	31.	24.50	30.	26.90	24.	16.60	28.	26.70
100.000	29.	15.20	36.	26.80	34.	30.60	27.	19.00	32.	32.00
200.000	32.	15.50	41.	28.90	39.	34.30	29.	21.80	36.	37.80
500.000	36.	15.80	49.	31.60	46.	39.00	31.	25.80	42.	45.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II0.0

AMABLE DU FOND RIVER AT SAMUEL DE CHAMPLAIN PARK 02JE019

DRAINAGE AREA : 1130.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

SAMPLE STATISTICS
MEAN = 94. S.D. = 16.0 C.S. = .2679 C.K. = 4.2987
SAMPLE STATISTICS (LOGS)
MEAN = 4.4118 S.D. = .1939 C.S. = -.1867 C.K. = 3.9259
SAMPLE MIN = 61. SAMPLE MAX = 115. N = 11

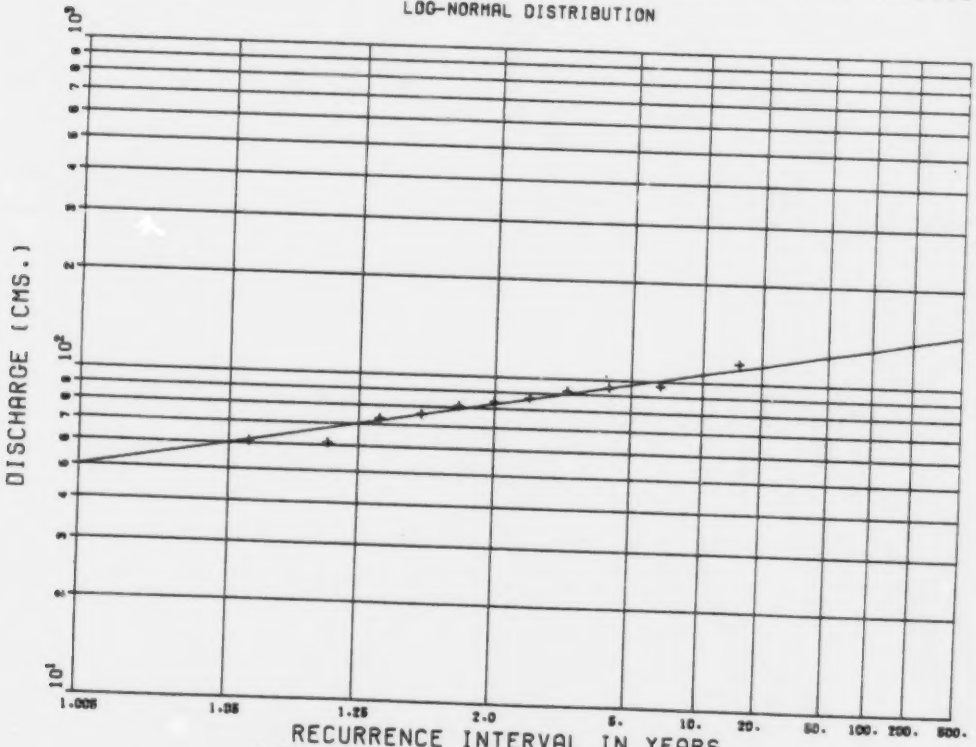
PARAMETERS FOR GUMBEL I A = .072777 U = 76.
PARAMETERS FOR LOGNORMAL P = 4.4118 S = .1939
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 61. M = 2.3071 S = 2.1194
STATISTICS OF LOG(X-A)
MEAN = 2.3071 S.D. = 2.1194 C.S. = -1.7543 C.K. = 5.8279
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0181 B = .1147E+03 LOG(M) = 6.4881
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .6573E+03
A = -.0259 B = .5124E+02
DISTRIBUTION STATISTICS MEAN = 4.4118 LOG(M)F= 5.7383 M = .3105E+03
S.D. = .1853 C.S. = -.2794

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	53.		50.		61.		49.		48.	
1.050	61.		60.		61.		60.		59.	
1.250	70.		70.		63.		71.		70.	
2.000	81.		82.		71.		83.		83.	
5.000	94.	5.24	95.	5.89	75.	12.50	96.	5.93	96.	6.29
10.000	107.	8.93	106.	7.89	121.	36.90	106.	6.04	107.	6.49
20.000	117.	10.00	113.	8.97	213.	61.70	104.	6.71	105.	7.37
50.000	130.	11.20	123.	10.30	389.	82.60	111.	7.92	112.	8.88
100.000	140.	12.00	129.	11.30	842.	105.00	117.	10.10	120.	11.50
200.000	149.	12.70	136.	12.10	1450.	118.00	122.	12.00	126.	13.80
500.000	162.	13.50	144.	13.30	2420.	130.00	127.	14.00	131.	16.20
					4569.	144.00	132.	16.90	139.	19.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

AMABLE DU FOND RIVER AT SAMUEL DE CHAMPLAIN PARK 02JE019

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : III.0

ASHEWEIG RIVER ABOVE LONG DOG LAKE 04DB002

DRAINAGE AREA : 3240.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1977

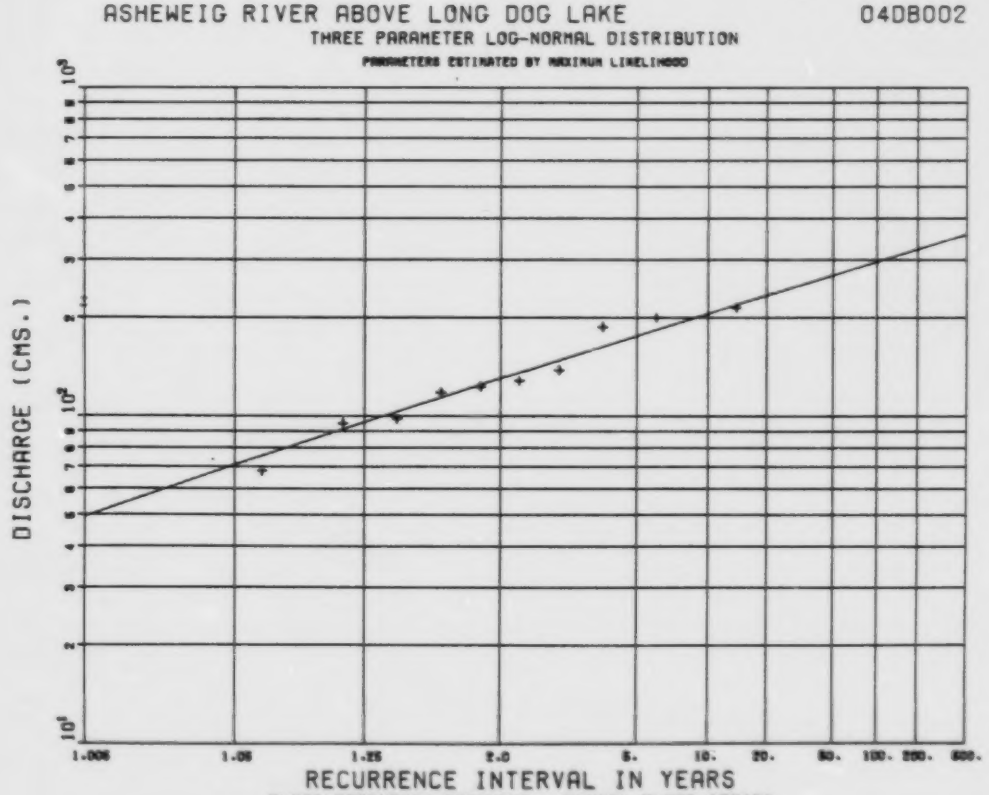
SAMPLE STATISTICS
MEAN = 137. S.D. = 48.4 C.S. = .4479 C.K. = 3.4833
SAMPLE STATISTICS (LOGS)
MEAN = 4.8616 S.D. = .3621 C.S. = -.1566 C.K. = 3.8659
SAMPLE MIN = 68. SAMPLE MAX = 214. N = 10

PARAMETERS FOR GUMBEL I A = .026200 U = 115.
PARAMETERS FOR LOGNORMAL M = 4.8616 S = .3621
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -9. M = 4.9347 S = .3365
STATISTICS OF LOG(X-A)
MEAN = 4.9347 S.D. = .3365 C.S. = -.1848 C.K. = 3.7931
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0283 B = .1632E+03 LOG(P) = 9.4875
ME= .1319E+05

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	51.		51.		49.		0.		48.	
1.050	73.		71.		71.		0.		70.	
1.250	97.		95.		95.		0.		96.	
2.000	124.		129.		133.		0.		130.	
2.330	137.	11.20	138.	11.50	138.	12.10	0.	0.00	139.	12.30
5.000	172.	12.60	175.	13.30	175.	13.60	0.	0.00	176.	12.80
10.000	201.	13.90	206.	15.50	205.	15.40	0.	0.00	204.	14.60
20.000	228.	14.90	234.	17.60	233.	18.60	0.	0.00	231.	17.70
50.000	264.	16.10	272.	20.20	268.	23.20	0.	0.00	264.	22.90
100.000	291.	16.80	300.	22.00	295.	26.80	0.	0.00	288.	27.50
200.000	317.	17.40	328.	23.80	322.	30.50	0.	0.00	311.	32.30
500.000	352.	18.10	367.	26.00	357.	35.20	0.	0.00	342.	39.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I12.0

ASHEWEIG RIVER AT STRAIGHT LAKE 04DB001

DRAINAGE AREA = 7950.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1980

SAMPLE STATISTICS
MEAN = 293. S.D. = 96.9 C.S. = -.0882 C.K. = 3.1777
SAMPLE STATISTICS (LOGS)
MEAN = 5.6218 S.D. = .3679 C.S. = -.7379 C.K. = 4.0155
SAMPLE MIN = 132. SAMPLE MAX = 450. N = 14

PARAMETERS FOR GUMBEL I A = .011447 U = 246.
PARAMETERS FOR LOGNORMAL M = 5.6218 S = .3679

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1257 B = .7347E+01 LOG(P) = 6.6191
ME= .7493E+03

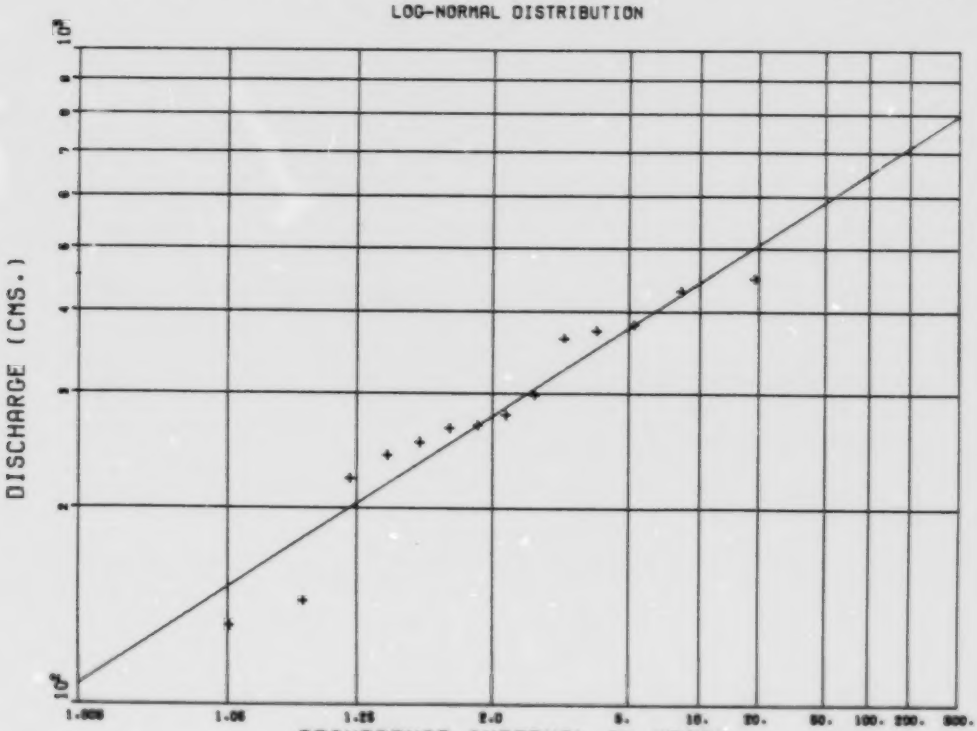
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD LOG PEARSON III		MOMENTS LOG PEARSON III	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	101.		107.		0.		0.		83.	
1.050	149.		151.		0.		0.		141.	
1.250	205.		203.		0.		0.		207.	
2.000	276.		276.		0.		0.		283.	
2.330	297.	9.98	295.	9.91	0.	0.00	0.	0.00	307.	10.60
5.000	377.	11.20	377.	11.40	0.	0.00	0.	0.00	379.	9.10
10.000	443.	12.20	443.	13.30	0.	0.00	0.	0.20	426.	9.54
20.000	506.	13.10	506.	15.10	0.	0.00	0.	0.00	465.	12.00
50.000	587.	14.00	586.	17.30	0.	0.00	0.	0.00	506.	16.90
100.000	648.	14.60	650.	18.90	0.	0.00	0.	0.06	533.	21.10
200.000	709.	15.00	713.	20.40	0.	0.00	0.	0.20	557.	25.40
500.000	789.	15.60	797.	22.30	0.	0.00	0.	0.00	583.	31.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ASHEWEIG RIVER AT STRAIGHT LAKE 04DB001

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 113.0

ATTAWAPISKAT RIVER BELOW ATTAWAPISKAT LAKE 04FB001

DRAINAGE AREA = 24200.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1968 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	886.	295.	.464	3.328
LN X SERIES	6.72	.38	-.769	4.498

X(MIN)= 343. CMS. TOTAL SAMPLE SIZE= 17
X(MAX)= 1440. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	920.	276.	.237	3.298
LN X SERIES	6.78	.32	-.396	3.910
LN (X-A) SERIES	7.51	.15	-.042	3.427

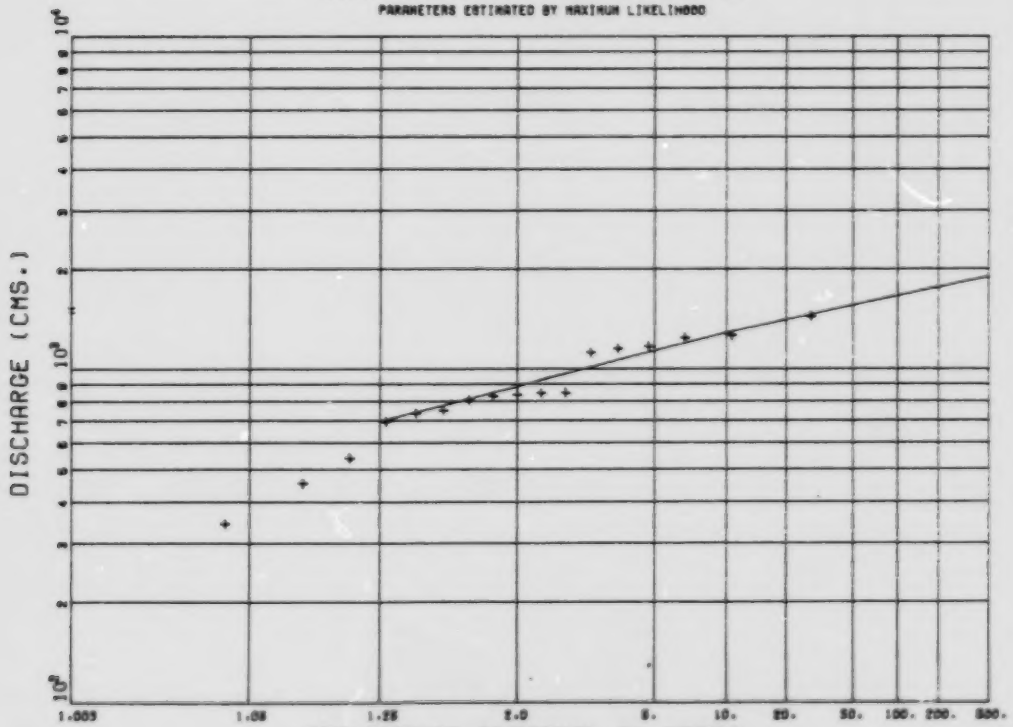
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -917.2476 M = 7.5052 S = .1516

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	693.
2.000	.500	879.
2.330	.429	931.
5.000	.200	1130.
10.000	.100	1240.
20.000	.050	1340.
50.000	.020	1550.
100.000	.010	1650.
200.000	.005	1760.
500.000	.002	1890.

ATTAWAPISKAT RIVER BELOW ATTAWAPISKAT LAKE 04FB001
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 114.0

ATTAWAPISKAT RIVER BELOW MUKETEI RIVER 04FC001

DRAINAGE AREA = 36800.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1969 - 1982

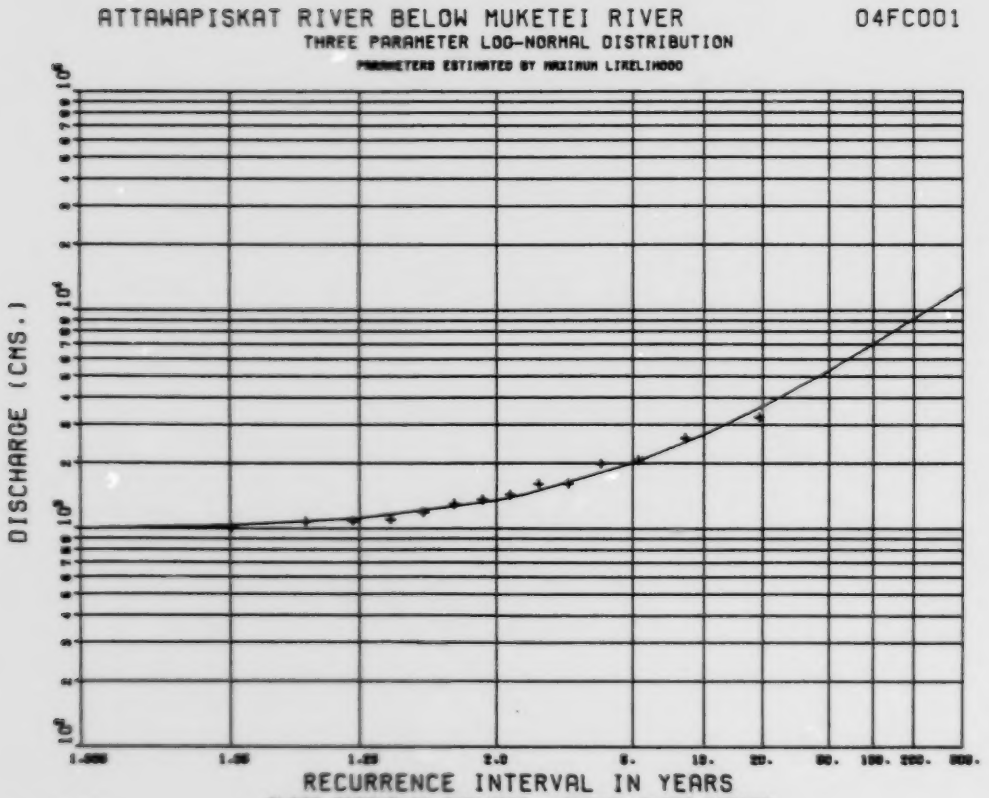
SAMPLE STATISTICS
MEAN = 1616. S.D. = 649.6 C.S. = 1.4741 C.K. = 5.6543
SAMPLE STATISTICS (LOGS)
MEAN = 7.3249 S.D. = .3536 C.S. = .8873 C.K. = 3.8473
SAMPLE MIN = 1012. SAMPLE MAX = 3234. N = 14

PARAMETERS FOR GUMBEL I A = .0022482 U = 1350.
PARAMETERS FOR LOGNORMAL P = 7.3249 S = .3536
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 679. M = 5.9006 S = 1.2042
STATISTICS OF LOG(X-A)
MEAN = 5.9006 S.D. = 1.2042 C.S. = -.3864 C.K. = 3.4067
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1269 B = .5081E+01 LOG(M) = 6.5279
ME= .6840E+03

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	678.		618.		995.		0.		910.	
1.050	962.		844.		1030.		0.		1130.	
1.250	1160.		1130.		1119.		0.		1120.	
2.000	1500.		1520.		1340.		0.		1440.	
2.330	1585.	8.63	1620.	9.52	1430.	10.40	0.	0.00	1530.	11.20
5.000	1957.	9.93	2040.	11.00	1990.	19.00	0.	0.00	1990.	13.60
10.000	2266.	11.00	2390.	12.80	2690.	26.10	0.	0.00	2540.	19.10
20.000	2552.	12.00	2720.	14.50	3630.	37.30	0.	0.00	3220.	24.90
50.000	2923.	13.00	3140.	16.70	5310.	48.80	0.	0.00	3670.	36.00
100.000	3200.	13.50	3450.	18.20	6990.	56.80	0.	0.00	4410.	45.60
200.000	3446.	14.00	3770.	19.60	9400.	64.70	0.	0.00	5060.	55.30
500.000	3850.	14.70	4200.	21.40	12700.	73.70	0.	0.00	6210.	70.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 115.0

AUSABLE RIVER NEAR SPRINGBANK 02FF002

DRAINAGE AREA 1 865.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1948 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	222.	92.	.577	3.181
LN X SERIES	5.31	.44	-.442	3.614

X(MIN)= 61. CMS. TOTAL SAMPLE SIZE= 35
X(MAX)= 423. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	226.	89.	-.069	3.172
LN X SERIES	5.35	.40	-.086	2.367
LN (X-A) SERIES	5.35	.40	-.084	2.365

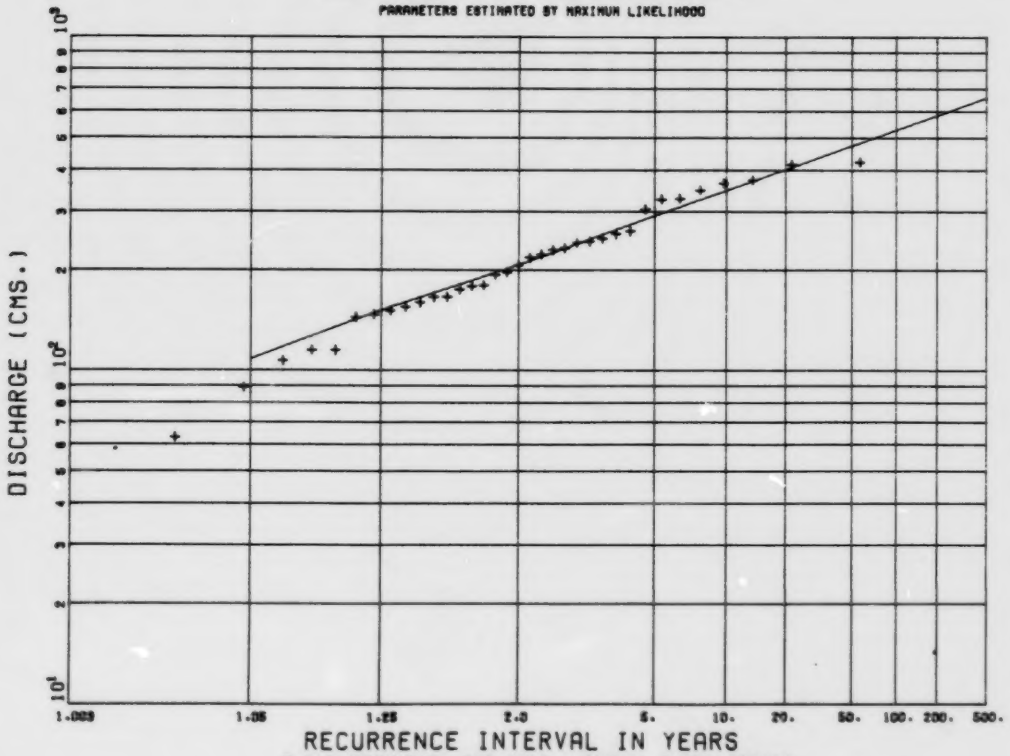
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -.5671 M = 5.3487 S = .3971

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	108.
1.250	.800	151.
2.000	.500	207.
2.330	.429	222.
5.000	.200	291.
10.000	.100	347.
20.000	.050	401.
50.000	.020	473.
100.000	.010	527.
200.000	.005	582.
500.000	.002	657.

AUSABLE RIVER NEAR SPRINGBANK 02FF002
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I16.0

AUX SABLES RIVER AT MASSEY 02CE002

DRAINAGE AREA : 1350.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1921 - 1982

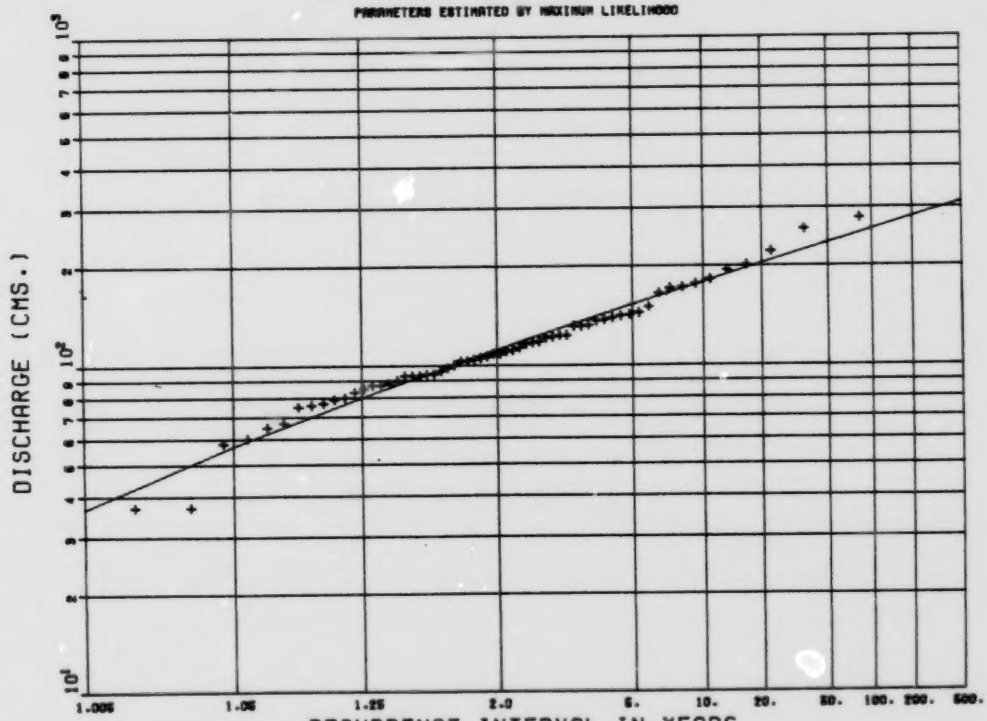
SAMPLE STATISTICS
MEAN = 110. S.D. = 46.8 C.S. = 1.2557 C.K. = 5.4213
SAMPLE STATISTICS (LOGS)
MEAN = 4.6961 S.D. = .3887 C.S. = -.2258 C.K. = 4.2288
SAMPLE MIN = 37. SAMPLE MAX = 278. N = 62

PARAMETERS FOR GUMBEL I A = .027894 U = 97.
PARAMETERS FOR LOGNORMAL M = 4.6961 S = .3887
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -22. M = 4.8882 S = .3190
STATISTICS OF LOG(X-A)
MEAN = 4.8862 S.D. = .3190 C.S. = .0788 C.K. = 3.9248
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0439 B = .7847E+02 LOG(M) = 8.1396
ME= .3428E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0270 B = .2041E+03
LOG(M)F=10.1996 M = .2689E+05
DISTRIBUTION STATISTICS MEAN = 4.6961 S.D. = .3852 C.S. = -.1400

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	37.		40.		37.		39.		37.	
1.050	57.		58.		57.		57.		56.	
1.250	80.		79.		80.		79.		79.	
2.000	110.		110.		111.		111.		111.	
5.000	118.	4.90	117.	4.98	119.	5.13	118.	5.26	119.	5.31
5.000	151.	5.43	152.	5.75	152.	5.40	152.	5.51	152.	5.42
10.000	178.	5.92	180.	6.66	178.	6.31	178.	6.38	178.	6.11
20.000	204.	6.32	208.	7.57	203.	7.54	203.	7.59	202.	7.34
50.000	237.	6.75	243.	8.71	234.	9.37	235.	9.31	232.	9.53
100.000	262.	7.02	270.	9.50	257.	10.80	258.	11.70	254.	11.40
200.000	287.	7.25	298.	10.30	280.	12.20	281.	13.70	275.	13.50
500.000	320.	7.50	336.	11.20	311.	14.10	311.	16.60	302.	16.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

AUX SABLES RIVER AT MASSEY 02CE002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I17.0

AVON RIVER BELOW STRATFORD 02GD018

DRAINAGE AREA : 144.8 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1965 - 1982

SAMPLE STATISTICS
MEAN = 60. S.D. = 18.7 C.S. = .5354 C.K. = 3.0788
SAMPLE STATISTICS (LOGS)
MEAN = 4.0419 S.D. = .3127 C.S. = .0333 C.K. = 2.6802
SAMPLE MIN = 34. SAMPLE MAX = 97. N = 18

PARAMETERS FOR GUMBEL I A = .067752 U = 51.
PARAMETERS FOR LOGNORMAL M = 4.0419 S = .3127
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 16. M = 3.6917 S = .4420
STATISTICS OF LOG(X-A)
MEAN = 3.6917 S.D. = .4420 C.S. = -.1639 C.K. = 2.6989
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0052 B = .3609E+04 LOG(M) = ********
ME= .3954E-06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0197 B = .2385E+03
LOG(M)F= -.6554 M = .5190E+00
DISTRIBUTION STATISTICS MEAN = 4.0419 S.D. = .3042 C.S. = .1295

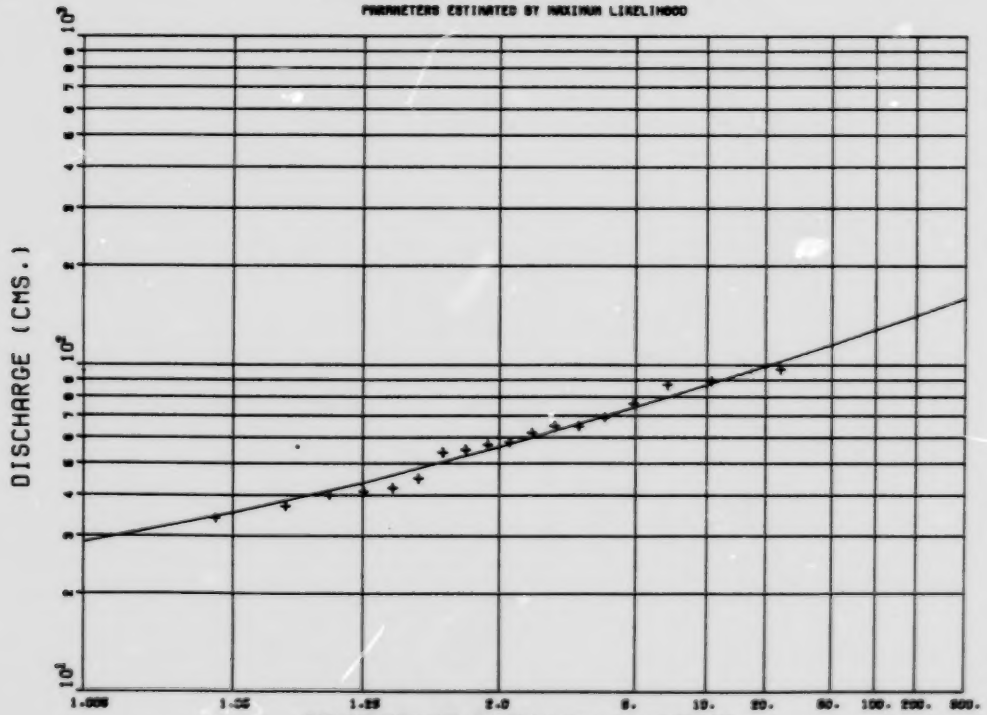
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	26.		25.		29.		27.		26.	
1.050	35.		34.		35.		35.		34.	
1.250	44.		44.		43.		44.		44.	
2.000	56.		57.		56.		57.		57.	
2.330	60.	7.41	60.	7.43	59.	8.11	60.	7.79	60.	7.99
5.000	73.	8.57	74.	8.58	74.	9.54	73.	8.67	74.	8.70
10.000	84.	9.55	85.	9.95	87.	11.80	84.	10.40	85.	10.30
20.000	95.	10.40	95.	11.30	99.	14.60	95.	12.90	96.	12.60
50.000	109.	11.30	108.	13.00	115.	18.70	109.	17.00	109.	16.60
100.000	119.	11.80	118.	14.20	128.	21.80	119.	20.40	119.	19.90
200.000	129.	12.30	127.	15.30	141.	24.90	129.	24.10	129.	23.40
500.000	143.	12.80	140.	16.70	159.	29.10	143.	29.10	142.	28.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

AVON RIVER BELOW STRATFORD 02GD018

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I18.0

BAILEY CREEK NEAR BEETON 02ED004

DRAINAGE AREA : 207.0 SQ. KM.
REGULATED FLOW : CLASS '
PERIOD OF RECORD : 1964 - 1978

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	27.	18.	1.055	5.954
LN X SERIES	3.14	.63	-.575	4.569

X(MIN)= 5. CMS.
X(MAX)= 67. CMS.
TOTAL SAMPLE SIZE= 15
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

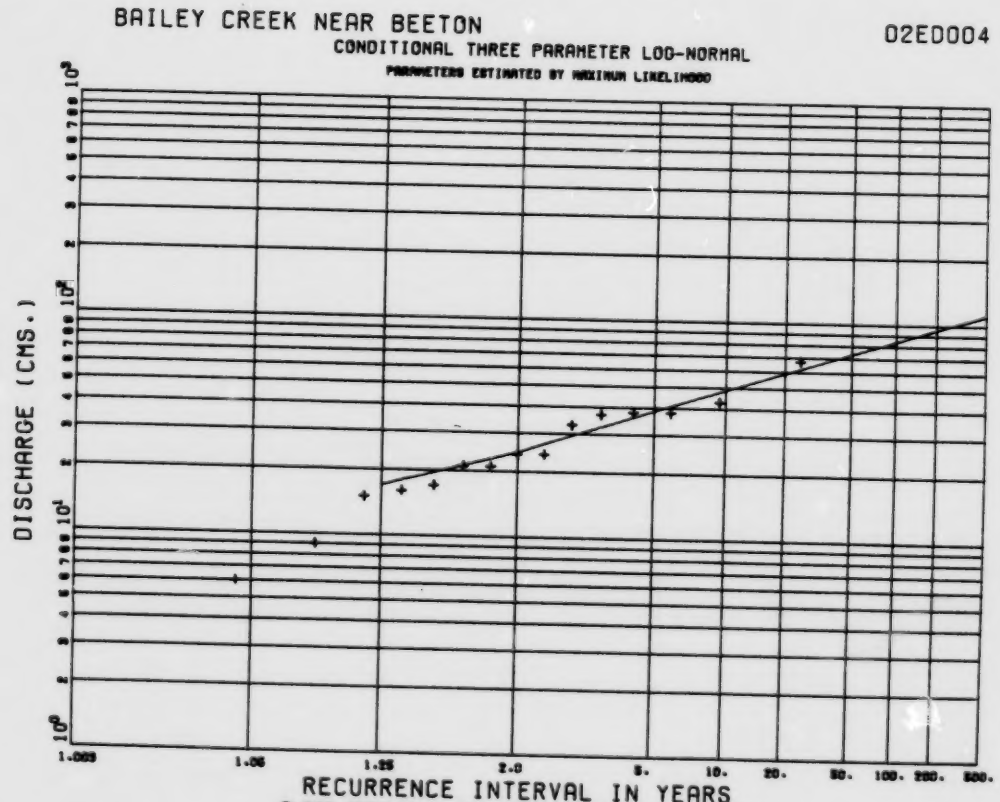
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	29.	18.	1.186	6.443
LN X SERIES	3.24	.52	-.142	4.321
LN (X-A) SERIES	3.27	.51	-.081	4.284

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -.7033 M = 3.2669 S = .5073

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	17.
2.000	.500	24.
2.330	.429	27.
5.000	.200	39.
10.000	.100	49.
20.000	.050	59.
50.000	.020	73.
100.000	.010	84.
200.000	.005	95.
500.000	.002	111.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 119.0

BASSWOOD RIVER NEAR WINTON 05PA012

DRAINAGE AREA = 4510.0 SQ. KM.
REGULATED FLOW = CLASS 2
PERIOD OF RECORD = 1930 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	163.	87.	1.320	8.077
LN X SERIES	5.01	.43	-.750	5.025

X(MIN)= 37. CMS. TOTAL SAMPLE SIZE= 53
X(MAX)= 442. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

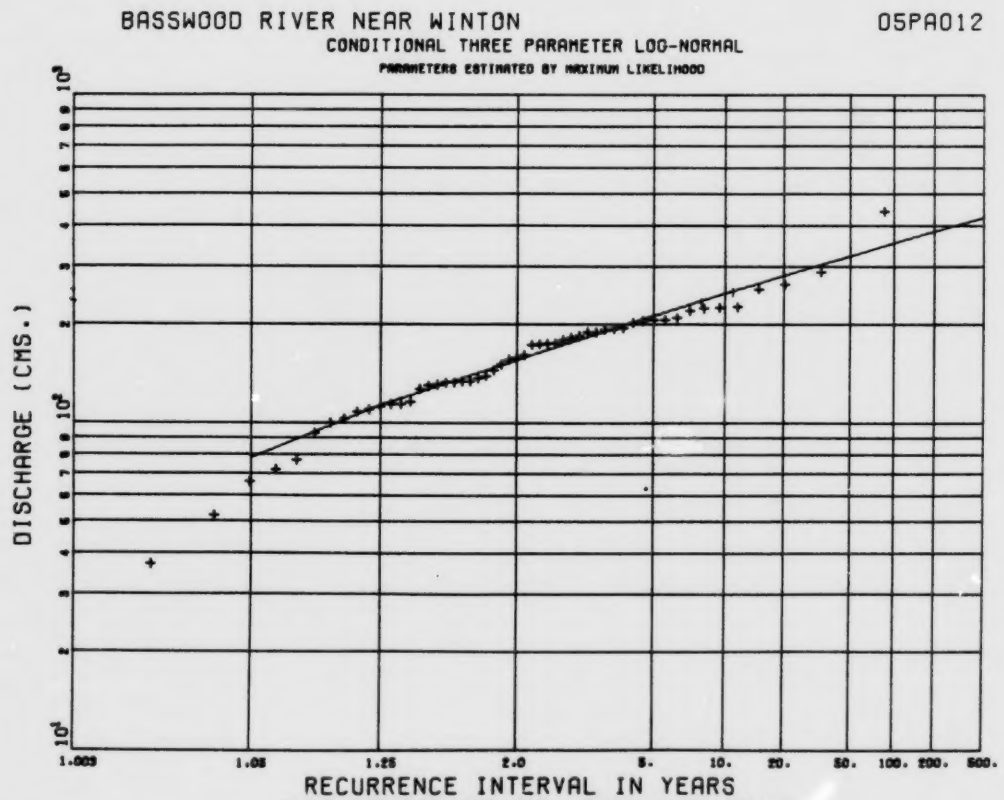
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	165.	85.	1.408	8.663
LN X SERIES	5.03	.39	-.330	4.180
LN (X-A) SERIES	5.33	.29	.055	4.174

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -49.3657 M = 5.3267 S = .2889

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	78.
1.250	.800	113.
2.000	.500	155.
2.330	.429	166.
5.000	.200	212.
10.000	.100	248.
20.000	.050	281.
50.000	.020	322.
100.000	.010	353.
200.000	.005	383.
500.000	.002	422.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I20.0

BATCHAWANA RIVER NEAR BATCHAWANA 02BF001

DRAINAGE AREA : 1198.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

SAMPLE STATISTICS
MEAN = 224. S.D. = 85.2 C.S. = 1.4184 C.K. = 7.0870
SAMPLE STATISTICS (LOGS)
MEAN = 5.3493 S.D. = .3544 C.S. = .3586 C.K. = 3.7623
SAMPLE MIN = 130. SAMPLE MAX = 460. N = 15

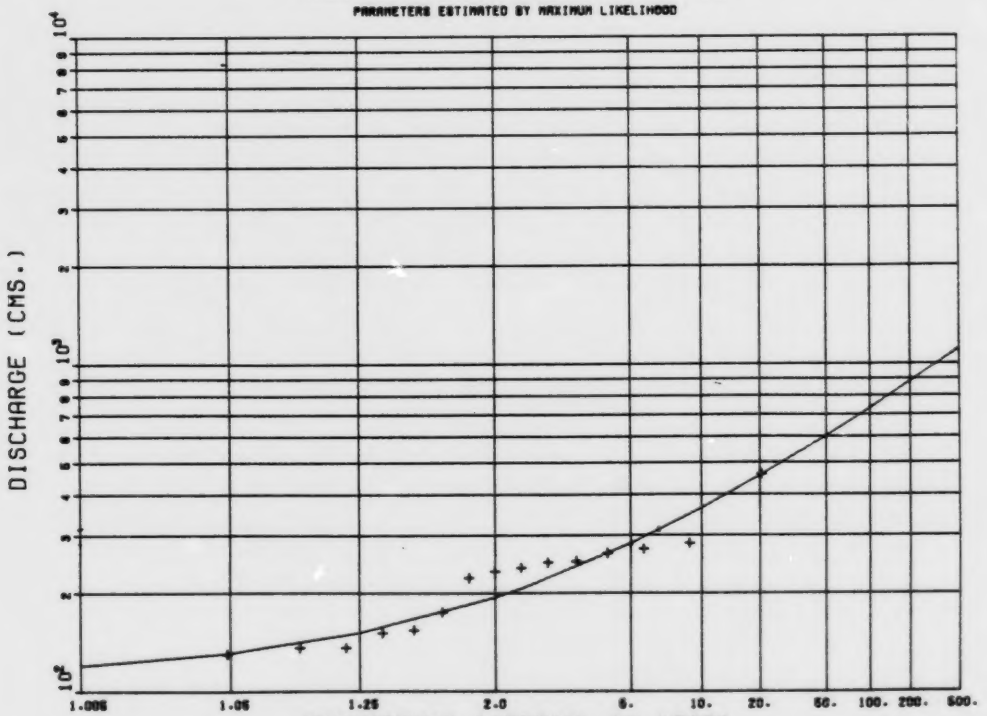
PARAMETERS FOR GUMBEL I A = .016630 U = 187.
PARAMETERS FOR LOGNORMAL M = 5.3493 S = .3544
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 111. M = 4.4216 S = .8640
STATISTICS OF LOG(X-A)
MEAN = 4.4216 S.D. = .8640 C.S. = -.4057 C.K. = 2.8598
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8635 B = .3111E+02 LOG(M) = 3.3729
ME= .2916E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	87.		85.		120.		0.		95.	
1.050	120.		117.		131.		0.		122.	
1.250	156.		156.		151.		0.		156.	
2.000	209.		210.		194.		0.		206.	
2.330	222.	8.87	224.	9.22	208.	10.80	0.	0.00	220.	10.10
5.000	278.	10.10	284.	10.60	283.	15.80	0.	0.00	281.	11.70
10.000	323.	11.10	331.	12.30	343.	21.40	0.	0.00	335.	14.60
20.000	366.	12.00	377.	14.00	406.	27.40	0.	0.00	390.	18.70
50.000	422.	12.90	436.	16.10	502.	35.40	0.	0.00	466.	25.30
100.000	464.	13.50	480.	17.60	732.	41.10	0.	0.00	529.	30.90
200.000	506.	14.00	524.	19.00	882.	46.70	0.	0.00	591.	36.70
500.000	561.	14.60	584.	20.80	1110.	53.70	0.	0.00	683.	44.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BATCHAWANA RIVER NEAR BATCHAWANA 02BF001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I21.0

BAYFIELD RIVER NEAR VARNA 02FF007

DRAINAGE AREA = 466.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

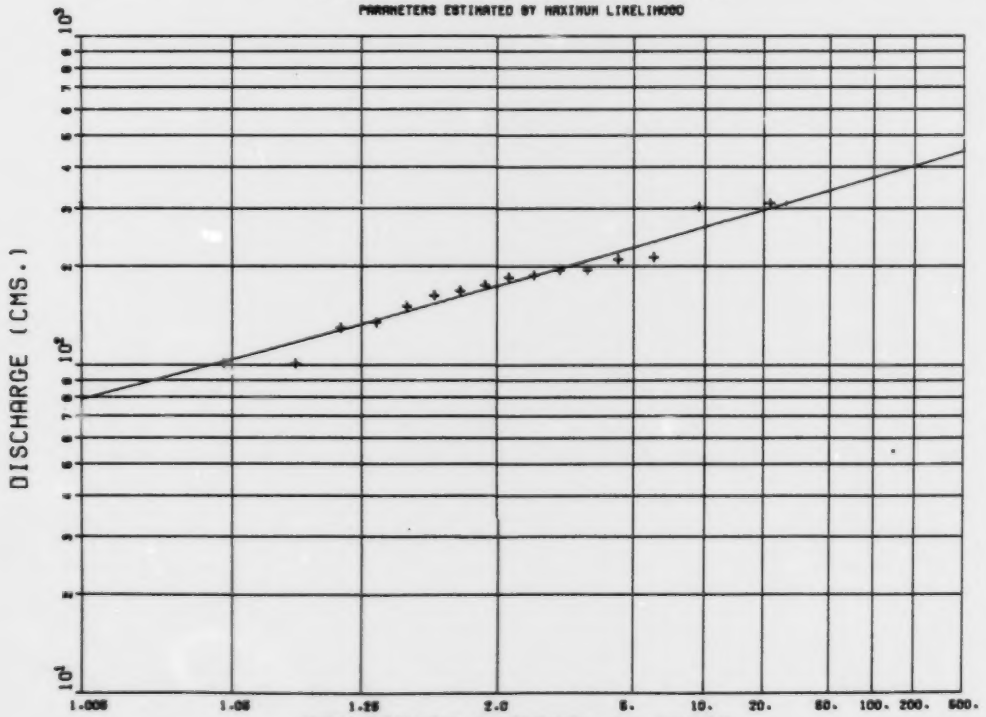
SAMPLE STATISTICS
MEAN = 183. S.D. = 59.4 C.S. = .9098 C.K. = 4.6646
SAMPLE STATISTICS (LOGS)
MEAN = 5.1605 S.D. = .3187 C.S. = .0293 C.K. = 3.8482
SAMPLE MIN = 101. SAMPLE MAX = 311. N = 16

PARAMETERS FOR GUMBEL I A = .021658 U = 156.
PARAMETERS FOR LOGNORMAL M = 5.1605 S = .3187
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 12. M = 5.0868 S = .3433
STATISTICS OF LOG(X-A)
MEAN = 5.0860 S.D. = .3433 C.S. = -.8372 C.K. = 3.8403
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0147 B = .4652E+04 LOG(M) =********
ME= .6314E-07
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1051 B = .3699E+04
LOG(M)F=******** M = .1230E-05
DISTRIBUTION STATISTICS MEAN = 5.1605 S.D. = .3088 C.S. = .0329

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	79.		77.		79.		79.		77.	
1.050	105.		103.		104.		105.		103.	
1.250	134.		133.		133.		134.		133.	
2.000	173.		174.		174.		174.		174.	
3.330	193.	8.00	194.	8.03	194.	8.57	194.	8.36	194.	8.64
5.000	226.	9.22	228.	9.27	228.	9.47	226.	9.10	228.	9.39
10.000	260.	10.30	262.	10.80	263.	11.40	259.	10.80	262.	11.10
20.000	293.	11.10	294.	12.20	296.	13.80	290.	13.20	295.	13.60
50.000	336.	12.10	335.	14.00	339.	17.40	330.	17.30	337.	17.80
100.000	369.	12.70	366.	15.30	371.	20.30	360.	20.80	368.	21.40
200.000	401.	13.20	396.	16.60	403.	23.20	390.	24.40	400.	25.20
500.000	443.	13.70	436.	18.10	447.	28.90	429.	29.50	441.	30.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BAYFIELD RIVER NEAR VARNA 02FF007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I22.0

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

BEAR BROOK NEAR BOURGET 02LB008

DRAINAGE AREA 440.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1949 - 1982

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	135.	72.	1.047	4.150
LN X SERIES	4.77	.55	-.257	3.299
LN (X-A) SERIES	4.96	.45	-.018	3.171

3 PARAMETER LOGNORMAL WITH CENSORING

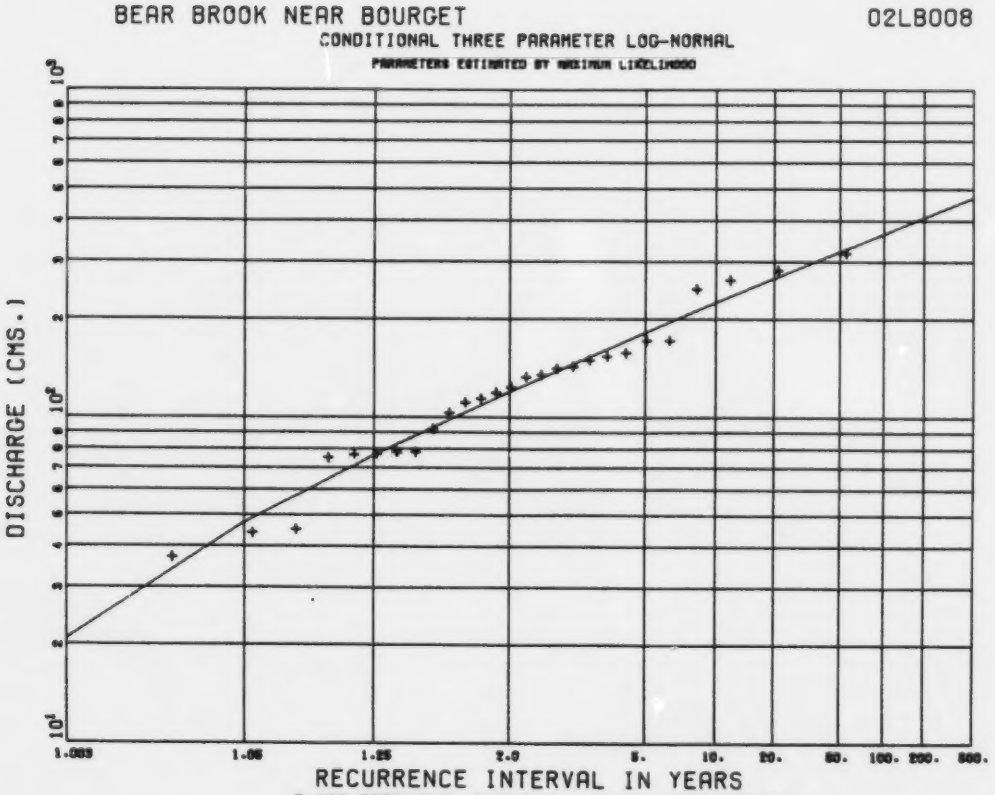
PARAMETERS A = -22.0446 M = 4.9491 S = .4332

MEAN = 133. SD = 70. CS = 1.457 CK = 6.997

UPPER LIMIT X = 36.0750
LOWER LIMIT X = -77.9250

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	.997	21.
1.050	.952	47.
1.250	.800	76.
2.000	.500	119.
2.330	.429	130.
5.000	.200	181.
10.000	.100	224.
20.000	.050	266.
50.000	.020	321.
100.000	.010	364.
200.000	.005	408.
500.000	.002	469.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I23.0

BEAR CREEK ABOVE WILKESPORT 02GG004

DRAINAGE AREA : 609.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1965 - 1982

SAMPLE STATISTICS
MEAN = 105. S.D. = 45.7 C.S. = 1.0036 C.K. = 5.0298
SAMPLE STATISTICS (LOGS)
MEAN = 4.5614 S.D. = .4337 C.S. = -.0121 C.K. = 3.3223
SAMPLE MIN = 49. SAMPLE MAX = 225. N = 18

PARAMETERS FOR GUMBEL I A = .029105 U = 84.
PARAMETERS FOR LOGNORMAL M = 4.5614 S = .4337
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 16. M = 4.3584 S = .5301
STATISTICS OF LOG(X-A)
MEAN = 4.3584 S.D. = .5301 C.S. = -.1777 C.K. = 2.9418
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0026 B = .2752E+05 LOG(M) =76.5046
ME= .1681E+34
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0053 B = .6436E+04
LOG(M)= 36.3762 M = .4641E+17
DISTRIBUTION STATISTICS MEAN = 4.5614 S.D. = .4215 C.S. = -.0249

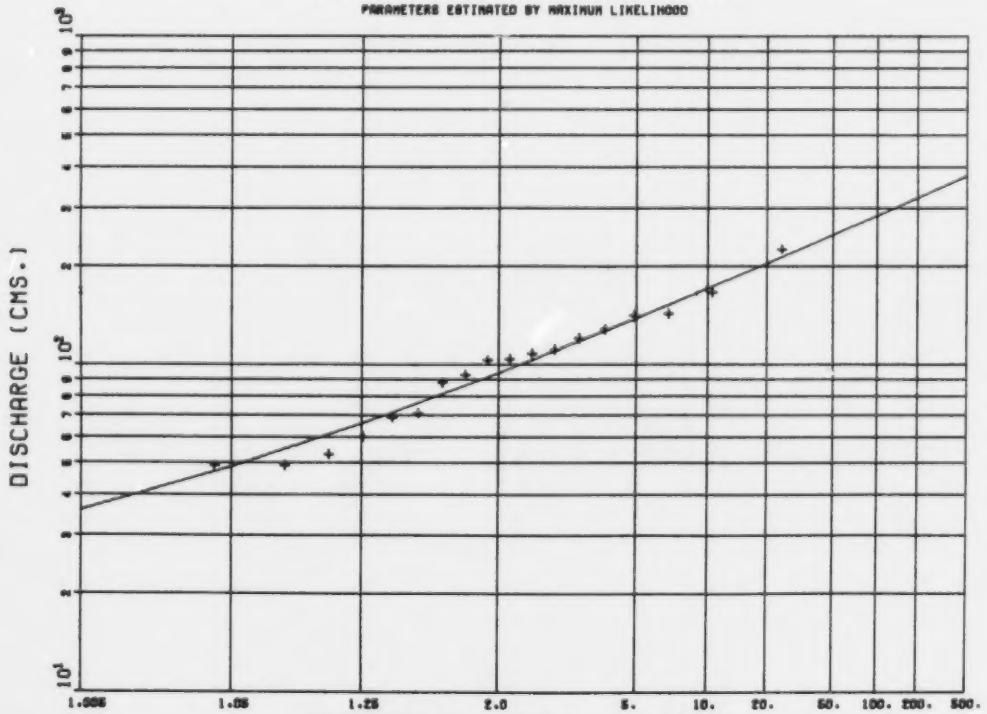
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	27.		31.		36.		32.		31.	
1.050	46.		47.		49.		48.		47.	
1.250	68.		66.		66.		67.		67.	
2.000	97.		96.		94.		96.		96.	
2.330	104.	9.87	103.	10.30	102.	11.10	103.	10.70	103.	11.10
5.000	136.	10.70	138.	11.90	138.	12.90	137.	11.50	138.	11.90
10.000	162.	11.60	167.	13.80	170.	15.70	164.	13.50	167.	14.00
20.000	186.	12.30	195.	15.70	203.	19.20	191.	16.50	195.	17.10
50.000	218.	13.00	233.	18.00	248.	24.50	226.	21.50	233.	22.70
100.000	242.	13.50	262.	19.70	284.	27.60	253.	25.80	261.	26.70
200.000	266.	13.90	293.	21.20	322.	31.20	281.	30.30	291.	31.40
500.000	298.	14.30	334.	23.20	375.	35.80	318.	36.60	332.	38.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BEAR CREEK ABOVE WILKESPORT 02GG004

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I24.0

BEAR CREEK NEAR PETROLIA 02GG006

DRAINAGE AREA : 267.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

SAMPLE STATISTICS
MEAN = 95. S.D. = 48.8 C.S. = 1.2333 C.K. = 5.9428
SAMPLE STATISTICS (LOGS)
MEAN = 4.4492 S.D. = .5081 C.S. = -.1800 C.K. = 3.6635
SAMPLE MIN = 15. SAMPLE MAX = 226. N = 16

PARAMETERS FOR GUMBEL I A = .228039 U = 75.
PARAMETERS FOR LOGNORMAL M = 4.4492 S = .5081
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -7. M = 4.5361 S = .4655
STATISTICS OF LOG(X-A)
MEAN = 4.5361 S.D. = .4655 C.S. = -.0801 C.K. = 3.6817
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0457 B = .1234E+03 LOG(P) =10.0945
ME= .2421E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1524 B = .8691E+02
LOG(M)E= 9.9395 M = .8429E+04
DISTRIBUTION STATISTICS MEAN = 4.4492 S.D. = .4924 C.S. = -.2145

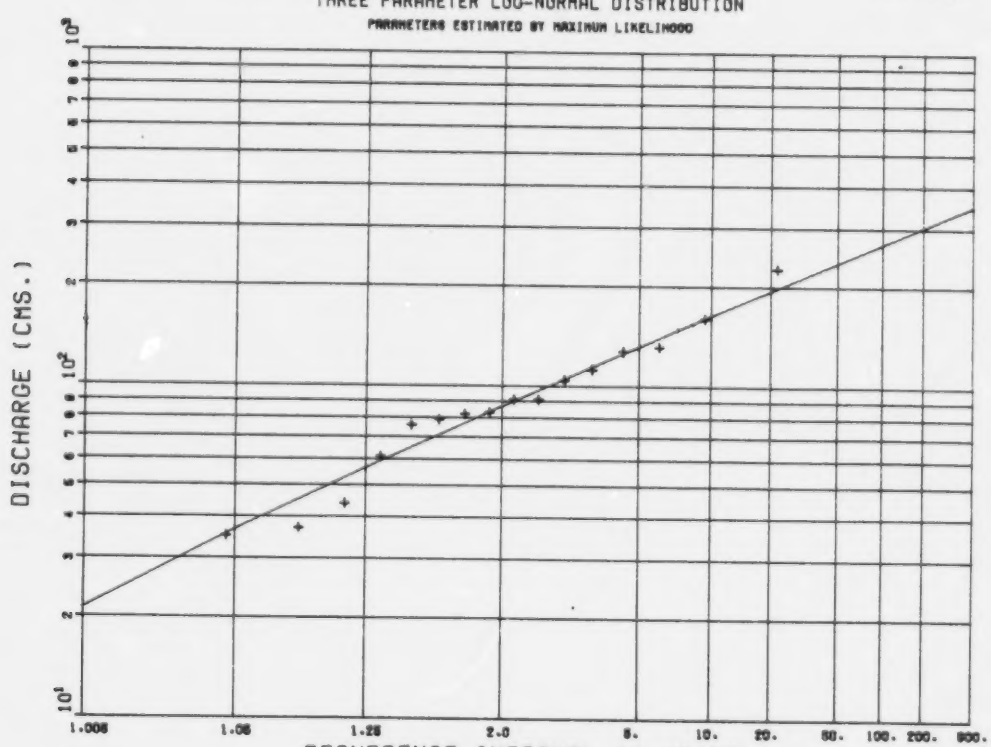
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	16.		23.		21.		22.		2.	
1.050	35.		37.		37.		37.		36.	
1.250	58.		56.		56.		57.		56.	
2.000	88.		86.		86.		87.		87.	
2.330	96.	11.80	94.	12.80	94.	13.20	95.	13.10	95.	13.70
5.000	129.	12.50	131.	14.80	131.	14.30	130.	13.60	132.	14.10
10.000	155.	13.30	164.	17.10	163.	16.80	159.	15.30	162.	16.10
20.000	181.	13.90	197.	19.50	194.	20.10	186.	16.20	192.	18.40
50.000	214.	14.60	243.	22.40	236.	24.80	222.	21.40	231.	25.10
100.000	239.	15.10	279.	24.50	269.	28.30	249.	27.80	261.	33.10
200.000	264.	15.40	317.	26.40	303.	31.80	276.	32.80	291.	35.40
500.000	297.	15.80	370.	28.80	350.	36.40	311.	39.30	331.	42.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BEAR CREEK NEAR PETROLIA 02GG006

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I25.0

BEAVER RIVER ABOVE EUGENIA POWER HOUSE 02FB001

DRAINAGE AREA : 254.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1921 - 1951

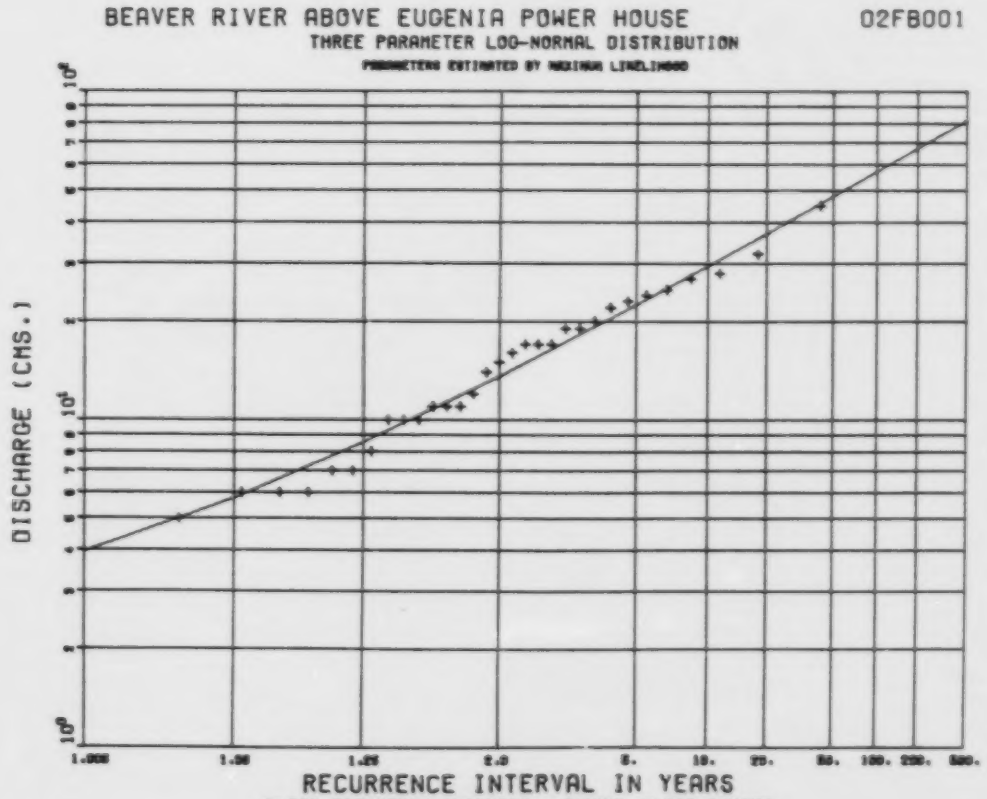
SAMPLE STATISTICS
MEAN = 16. S.D. = 9.1 C.S. = 1.1907 C.K. = 5.2321
SAMPLE STATISTICS (LOGS)
MEAN = 2.6313 S.D. = .5630 C.S. = -.0459 C.K. = 2.5733
SAMPLE MIN = 5. SAMPLE MAX = 45. N = 31

PARAMETERS FOR GUMBEL I A = .152332 U = 12.
PARAMETERS FOR LOGNORMAL M = 2.6313 S = .5630
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 2.4607 S = .6658
STATISTICS OF LOG(X-A)
MEAN = 2.4607 S.D. = .6658 C.S. = -.2159 C.K. = 2.5968
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0129 B = .1897E+04 LOG(M) =27.1518
ME= .6193E+12
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0295 B = .3458E+03
LOG(M)F=12.9369 M = .4153E+06
DISTRIBUTION STATISTICS MEAN = 2.6313 S.D. = .5542 C.S. = -.1075

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		3.		4.		3.		3.	
1.050	5.		6.		6.		5.		5.	
1.250	9.		9.		9.		9.		9.	
2.000	15.		14.		14.		14.		14.	
2.330	16.	9.38	15.	10.20	15.	11.00	16.	10.70	15.	10.90
5.000	22.	9.66	22.	11.80	22.	12.80	22.	11.30	22.	11.70
10.000	27.	10.10	29.	13.60	29.	15.60	28.	13.00	29.	13.60
20.000	32.	10.50	35.	15.50	37.	18.70	34.	15.80	35.	16.60
50.000	38.	11.00	44.	17.80	48.	23.00	42.	20.40	44.	21.60
100.000	42.	11.30	52.	19.50	57.	26.20	48.	24.40	51.	25.90
200.000	47.	11.50	59.	21.00	67.	29.30	55.	28.60	58.	30.40
500.000	53.	11.70	70.	22.90	81.	33.30	64.	34.50	68.	36.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BEAVER RIVER ABOVE EUGENIA POWER HOUSE 02FB001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I26.0

BEAVER RIVER NEAR CLARKSBURG 02FB009

DRAINAGE AREA : 572.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1961 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	59.	18.	-.164	4.893
LN X SERIES	4.03	.35	-1.417	7.142

X(MIN)= 13. CMS. TOTAL SAMPLE SIZE= 22
X(MAX)= 90. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	61.	16.	.298	3.696
LN X SERIES	4.08	.26	-.422	4.162
LN (X-A) SERIES	4.07	.12	-.014	3.644

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -69.7629 M = 4.8681 S = .1189

FLOOD FREQUENCY REGIME

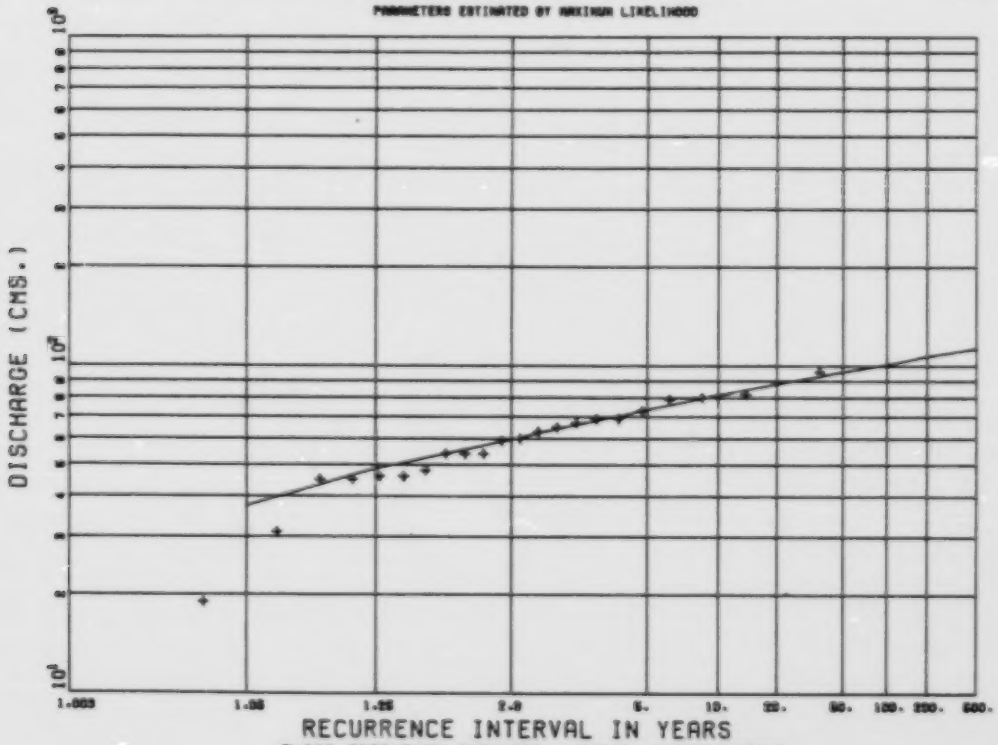
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	37.
1.250	.800	48.
2.000	.500	59.
5.000	.429	62.
10.000	.200	73.
20.000	.100	81.
50.000	.050	88.
100.000	.020	96.
200.000	.010	101.
500.000	.005	107.
	.002	113.

BEAVER RIVER NEAR CLARKSBURG 02FB009

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I27.0

BEAVER RIVER NEAR KIMBERLEY 02FB003

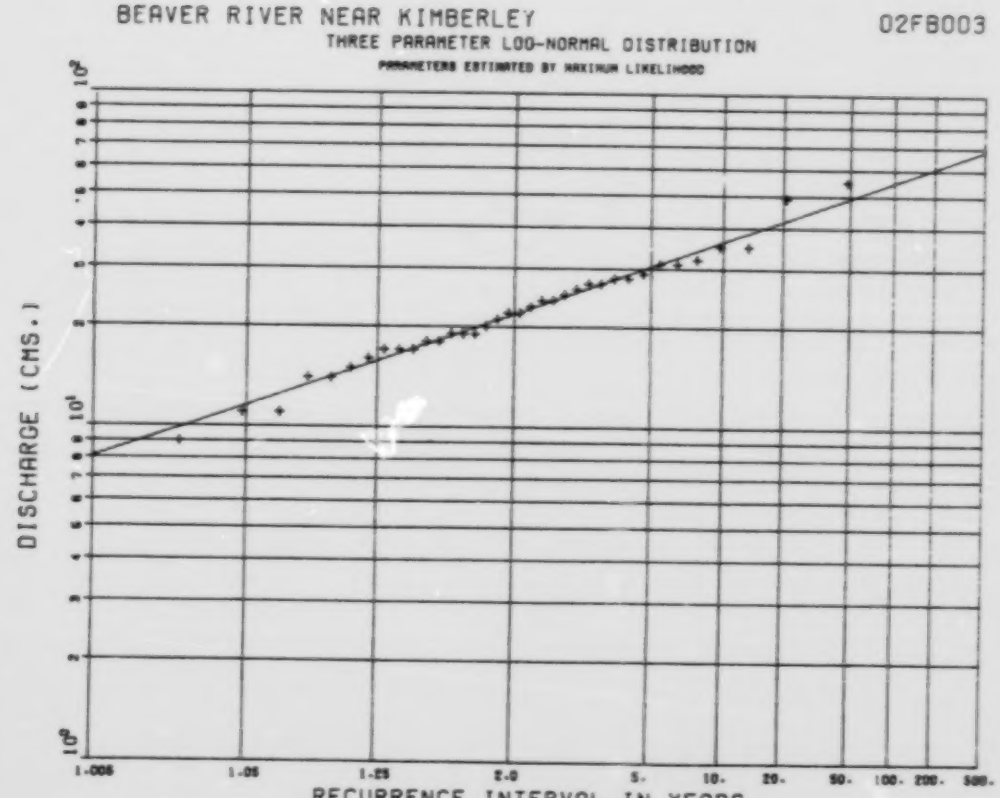
DRAINAGE AREA : 262.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1916 - 1951

SAMPLE STATISTICS
MEAN = 27. S.D. = 9.7 C.S. = 1.3568 C.K. = 6.8063
SAMPLE STATISTICS (LOGS)
MEAN = 3.0849 S.D. = .3926 C.S. = .0369 C.K. = 3.5782
SAMPLE MIN = 9. SAMPLE MAX = 55. N = 36

PARAMETERS FOR GUMBEL I A = .139811 U = 19.
PARAMETERS FOR LOGNORMAL M = 3.0849 S = .3926
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 0. M = 3.0802 S = .4021
STATISTICS OF LOG(X-A)
MEAN = 3.0802 S.D. = .4021 C.S. = .0873 C.K. = 3.5806
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0872 B = .2942E+04 LOG(M) = ********
ME= .1230E-07
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0094 B = .3670E+04
LOG(MI)= ******** M = .1425E-08
DISTRIBUTION STATISTICS MEAN = 3.0848 S.D. = .3871 C.S. = .0330

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	7.		8.		8.		8.		8.	
1.050	11.		12.		12.		12.		12.	
1.250	15.		16.		16.		16.		16.	
2.000	22.		22.		22.		22.		22.	
5.338	30.	9.44	30.	9.68	30.	9.78	30.	9.77	30.	7.18
10.000	35.	7.14	38.	7.62	38.	7.68	38.	7.61	38.	7.93
20.000	39.	7.77	36.	8.83	36.	9.18	36.	9.88	36.	9.15
50.000	45.	8.31	42.	10.80	42.	11.10	41.	11.10	42.	11.30
100.000	49.	8.87	48.	11.50	48.	13.00	48.	14.40	48.	14.70
200.000	52.	9.22	54.	12.60	55.	16.00	54.	17.40	55.	17.70
500.000	57.	9.52	68.	13.60	61.	18.10	60.	20.40	61.	20.80
	64.	9.85	68.	14.80	68.	20.90	68.	24.70	69.	25.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 128.0

BEAVERTON RIVER NEAR BEAVERTON 02EC011

DRAINAGE AREA : 282.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X	54.	14.	-.308	4.156
LN X	3.98	.24	-1.365	7.547

X(MIN)= 23. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 79. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X	56.	11.	.322	2.831
LN X	4.01	.20	.092	2.953
LN (X-A)	3.54	.32	-.113	3.189

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 20.1979 M = 3.5379 S = .3221

FLOOD FREQUENCY REGIME

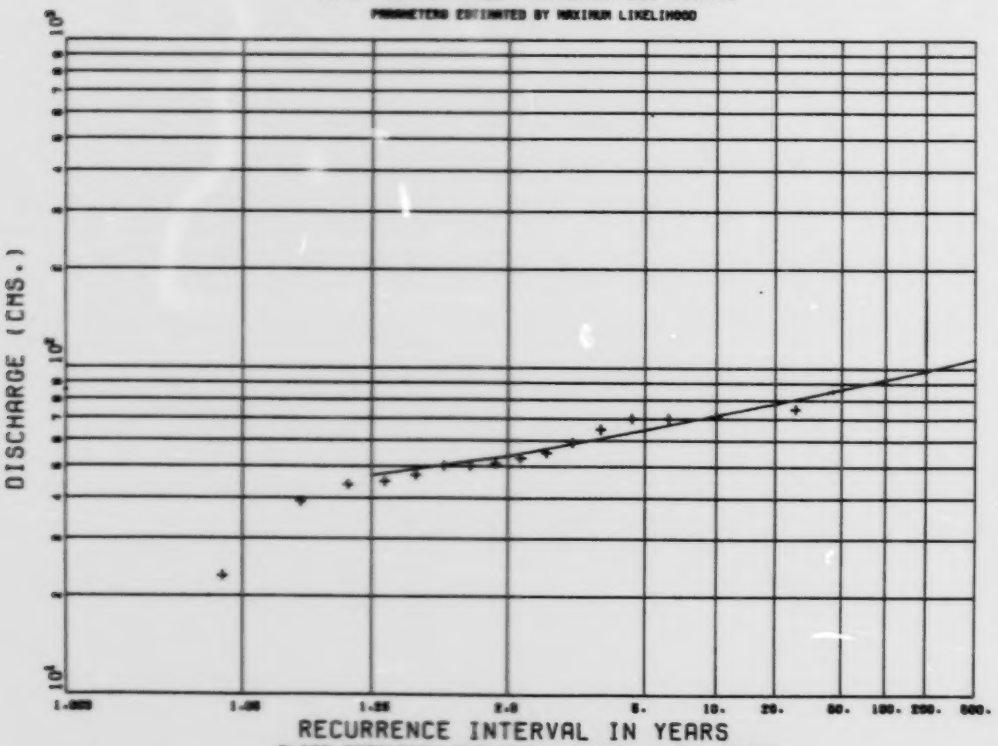
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.001	.997	-
1.050	.952	-
1.250	.800	47.
2.000	.500	54.
5.000	.429	56.
10.000	.200	65.
20.000	.100	72.
50.000	.042	78.
100.000	.020	86.
200.000	.010	92.
500.000	.005	99.
	.002	107.

BEAVERTON RIVER NEAR BEAVERTON 02EC011

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I29.0

BEETON CREEK NEAR TOTTENHAM 02ED100

DRAINAGE AREA : 86.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1969 - 1982

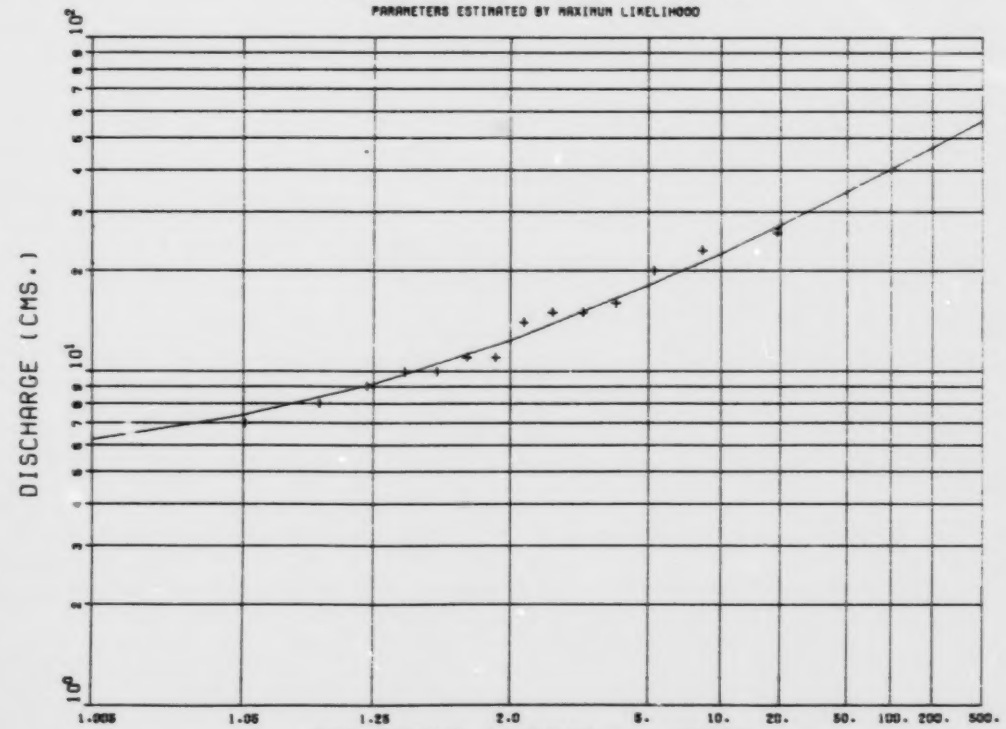
SAMPLE STATISTICS
MEAN = 14. S.D. = 5.7 C.S. = .9101 C.K. = 3.8738
SAMPLE STATISTICS (LOGS)
MEAN = 2.5600 S.D. = .3950 C.S. = .2869 C.K. = 3.0626
SAMPLE MIN = 7. SAMPLE MAX = 26. N = 14

PARAMETERS FOR GUMBEL I A = .244255 U = 11.
PARAMETERS FOR LOGNORMAL M = 2.5600 S = .3950
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 2.3027 S = .6719
STATISTICS OF LOG(X-A)
MEAN = 2.0027 S.D. = .6719 C.S. = -.1996 C.K. = 3.2716
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0566 B = .4865E+02 LOG(M) = -.1950
ME= .4228E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1523 B = .6638E+01
LOG(M)= 1.5458 M = .4692E+01
DISTRIBUTION STATISTICS MEAN = 2.5600 S.D. = .3937 C.S. = .7763

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	5.		5.		6.		6.		5.	
1.050	7.		7.		7.		7.		7.	
1.250	9.		9.		9.		9.		9.	
2.000	13.		13.		12.		12.		13.	
2.330	14.	10.10	14.	10.60	13.	11.30	13.	11.20	14.	11.60
5.000	18.	11.20	18.	12.30	18.	15.20	18.	14.60	18.	13.30
10.000	21.	12.30	22.	14.20	22.	19.50	22.	19.20	22.	16.40
20.000	24.	13.10	25.	16.20	27.	24.30	27.	24.70	26.	21.80
50.000	27.	14.00	29.	18.60	34.	30.60	34.	32.80	31.	27.90
100.000	30.	14.60	32.	20.30	40.	35.70	40.	39.40	35.	33.80
200.000	33.	15.10	36.	21.90	47.	40.90	48.	46.30	40.	40.10
500.000	37.	15.69	40.	24.00	56.	46.60	59.	55.90	46.	48.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BEETON CREEK NEAR TOTTENHAM 02ED100
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I30.0

BIG CREEK NEAR DELHI 02GC006

DRAINAGE AREA : 353.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1956 - 1982

SAMPLE STATISTICS
MEAN = 41. S.D. = 29.3 C.S. = 2.1357 C.K. = 9.5263
SAMPLE STATISTICS (LOGS)
MEAN = 3.5164 S.D. = .6480 C.S. = -.0034 C.K. = 3.4398
SAMPLE MIN = 10. SAMPLE MAX = 144. N = 27

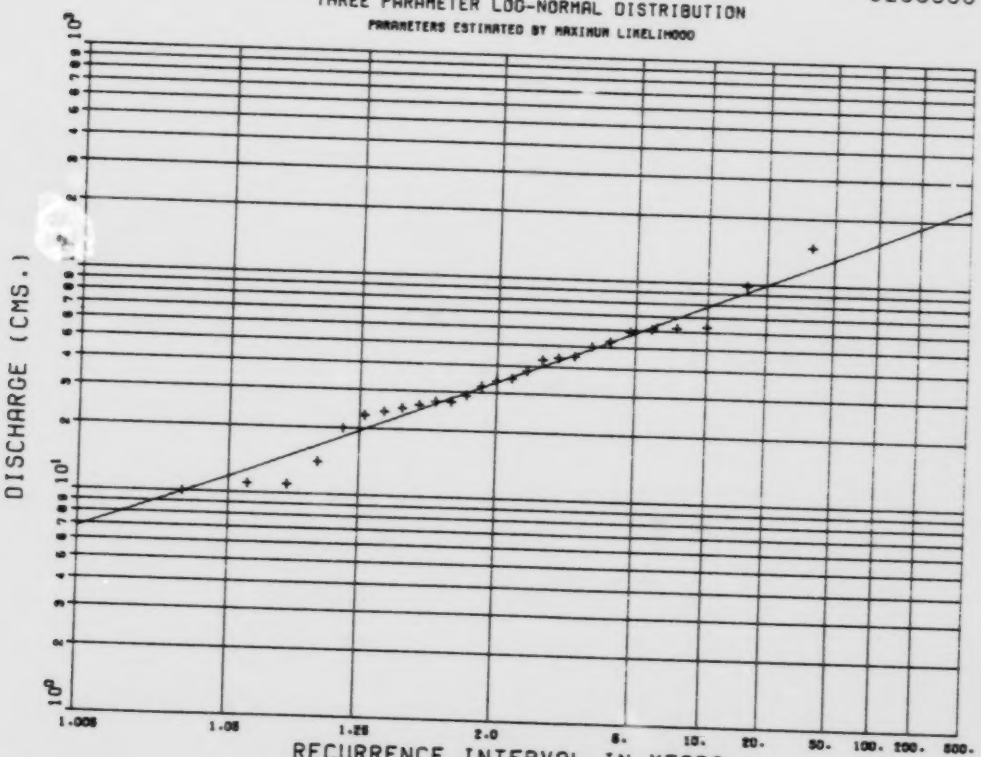
PARAMETERS FOR GUMBEL I A = .155069 U = 30.
PARAMETERS FOR LOGNORMAL M = 3.5164 S = .6480
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 3.4747 S = .6753
STATISTICS OF LOG(X-A)
MEAN = 3.4747 S.D. = .6753 C.S. = -.0737 C.K. = 3.4389
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0011 B = .3405E+06 LOG(M) = ********
ME= .5510+166

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-1.		6.		7.		0.		6.	
1.050	9.		12.		12.		0.		12.	
1.250	21.		20.		19.		0.		20.	
2.000	36.		34.		33.		0.		34.	
2.330	40.	11.00	38.	12.60	38.	13.20	0.	0.00	38.	13.50
5.000	57.	11.10	58.	14.50	58.	14.80	0.	0.00	58.	14.60
10.000	71.	11.50	77.	16.80	78.	17.80	0.	0.00	77.	17.10
20.000	84.	11.80	98.	19.10	99.	21.20	0.	0.00	99.	21.00
50.000	100.	12.20	127.	22.00	130.	25.80	0.	0.00	127.	27.40
100.000	113.	12.50	152.	24.60	156.	29.20	0.	0.00	152.	32.80
200.000	126.	12.70	179.	26.90	185.	32.50	0.	0.00	178.	38.60
500.000	142.	12.90	218.	28.30	227.	36.70	0.	0.00	217.	46.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BIG CREEK NEAR DELHI 02GC006
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 131.3

BIG CREEK NEAR KELVIN 02GC011

DRAINAGE AREA : 142.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1974 - 1978

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	32.	17.	.243	3.134
LN X SERIES	3.29	.71	-1.368	7.131

X(MIN)= 4. CMS. TOTAL SAMPLE SIZE= 15
X(MAX)= 62. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	34.	16.	.366	2.972
LN X SERIES	3.43	.49	-.276	3.504
LN (X-A) SERIES	3.58	.42	-.155	3.291

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -4.6063 M = 3.5818 S = .4242

FLOOD FREQUENCY REGIME

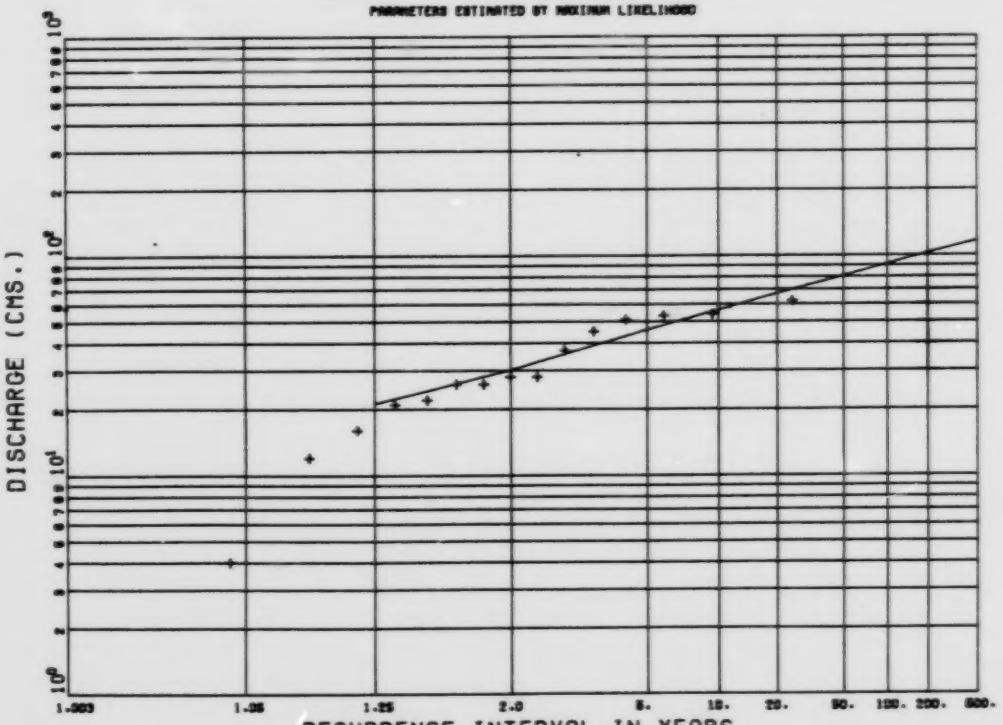
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	21.
2.000	.500	30.
2.330	.429	33.
5.000	.200	46.
10.000	.100	56.
20.000	.050	67.
50.000	.020	80.
100.000	.010	91.
200.000	.005	102.
500.000	.002	116.

BIG CREEK NEAR KELVIN 02GC011

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I32.0

BIG CREEK NEAR WALSINGHAM 02GC007

DRAINAGE AREA : 391.8 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1956 - 1982

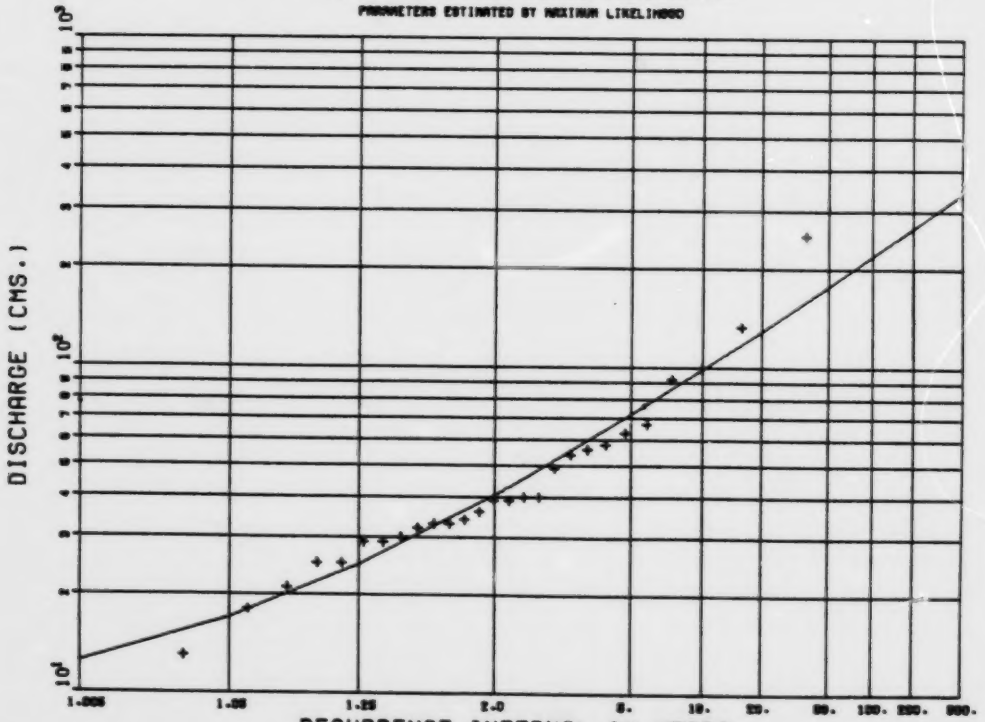
SAMPLE STATISTICS
MEAN = 53. S.D. = 48.0 C.S. = 3.8995 C.K. = 14.7849
SAMPLE STATISTICS (LOGS)
MEAN = 3.7484 S.D. = .6304 C.S. = .8778 C.K. = 4.8244
SAMPLE MIN = 13. SAMPLE MAX = 252. N = 27

PARAMETERS FOR GUMBEL I A = .044823 U = 37.
PARAMETERS FOR LOGNORMAL M = 3.7484 S = .6304
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 8. M = 3.4619 S = .8187
STATISTICS OF LOG(X-A)
MEAN = 3.4619 S.D. = .8187 C.S. = .2085 C.K. = 4.5876
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2767 B = .5192E+01 LOG(M) = 2.3120
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1009E+02
A = .1085 B = .1050E+02
LOG(P)F= 1.7694 M = .5868E+01
DISTRIBUTION STATISTICS MEAN = 3.7484 S.D. = .6107 C.S. = .6172

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-1.		0.		12.		13.		14.	
1.050	12.		15.		19.		18.		18.	
1.250	26.		25.		25.		25.		25.	
2.000	46.		43.		40.		40.		39.	
2.330	50.	11.00	48.	12.20	45.	13.20	45.	12.60	43.	14.40
5.000	71.	11.10	72.	14.10	72.	16.80	69.	15.80	69.	17.40
10.000	88.	11.50	95.	16.40	99.	19.80	96.	20.40	99.	23.10
20.000	105.	11.80	120.	18.60	129.	23.80	127.	26.10	136.	31.70
50.000	126.	12.20	155.	21.40	177.	29.10	180.	34.80	204.	46.00
100.000	142.	12.50	184.	23.40	219.	32.90	231.	41.80	272.	58.10
200.000	157.	12.70	215.	25.20	266.	36.70	292.	49.20	361.	71.20
500.000	178.	12.90	261.	27.50	338.	41.30	394.	59.40	520.	89.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BIG CREEK NEAR WALSINGHAM 02GC007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I33.0

BIG OTTER CREEK ABOVE OTTERVILLE 02GC017

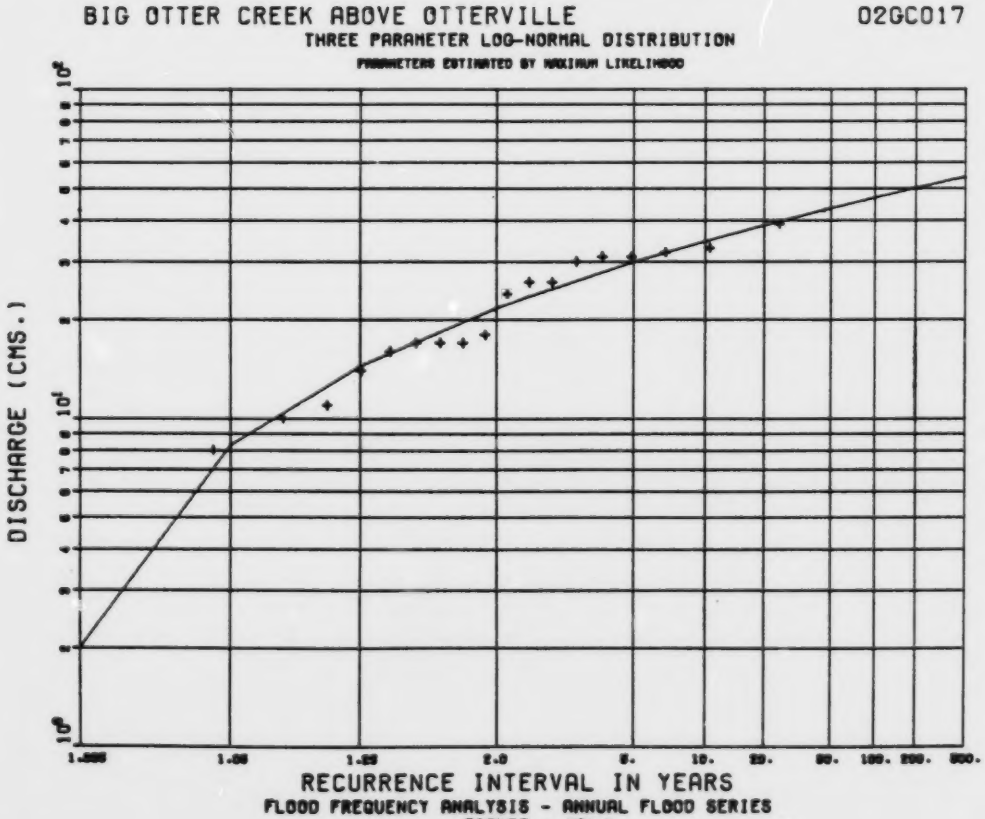
DRAINAGE AREA : 93.2 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1965 - 1982

SAMPLE STATISTICS
MEAN = 22. S.D. = 9.1 C.S. = .1236 C.K. = 2.4585
SAMPLE STATISTICS (LOGS)
MEAN = 3.0895 S.D. = .4588 C.S. = -.5001 C.K. = 2.9179
SAMPLE MIN = 8. SAMPLE MAX = 39. N = 18

PARAMETERS FOR GUMBEL I A = .127919 U = 18.
PARAMETERS FOR LOGNORMAL P = 3.0895 S = .4588
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -42. M = 4.1450 S = .1444
STATISTICS OF LOG(X-A)
MEAN = 4.1450 S.D. = .1444 C.S. = -.0812 C.K. = 2.4326
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1147 B = .1599E+02 LOG(M) = 4.8444
ME= .1278E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3291 B = .2217E+01
LOG(M)= 3.7362 M = .4206E+02
DISTRIBUTION STATISTICS MEAN = 3.0895 S.D. = .4908 C.S. =-1.3431

	GUMBEL I		LOGNORPAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD LOG PEARSON III		MOMENTS LOG PEARSON III	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	5.		6.		2.		3.		5.	
1.050	9.		10.		8.		8.		9.	
1.250	14.		14.		14.		14.		14.	
2.000	21.		20.		22.		23.		21.	
2.330	22.	18.40	22.	10.90	23.	10.20	24.	0.00	23.	11.60
5.000	30.	11.20	30.	12.60	30.	9.51	31.	0.00	30.	10.90
10.000	35.	12.00	37.	14.60	34.	10.40	34.	0.00	35.	11.70
20.000	41.	12.70	43.	16.60	39.	11.90	36.	0.00	40.	14.10
50.000	48.	13.40	52.	19.10	43.	14.40	39.	0.00	46.	18.80
100.000	54.	13.80	59.	20.80	47.	16.40	40.	0.00	50.	22.90
200.000	59.	14.20	66.	22.50	50.	18.50	41.	0.00	54.	27.30
500.000	66.	14.60	76.	24.50	54.	21.10	41.	0.00	58.	33.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I34.0

BIG OTTER CREEK AT TILLSONBURG 02GC010

DRAINAGE AREA = 342.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1961 - 1982

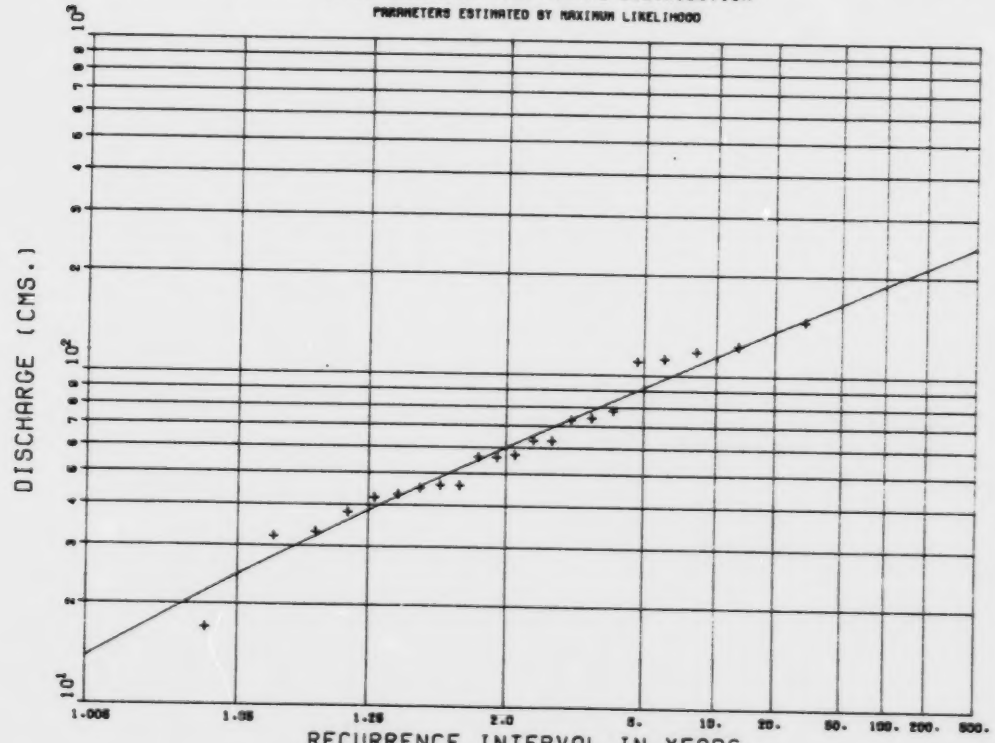
SAMPLE STATISTICS
MEAN = 67. S.D. = 34.3 C.S. = .8948 C.K. = 3.4154
SAMPLE STATISTICS (LOGS)
MEAN = 4.0774 S.D. = .5208 C.S. = -.2010 C.K. = 3.6643
SAMPLE MIN = 17. SAMPLE MAX = 146. N = 22

PARAMETERS FOR GUMBEL I A = .039855 U = 52.
PARAMETERS FOR LOGNORMAL M = 4.0778 S = .5208
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -6. M = 4.1862 S = .4663
STATISTICS OF LOG(X-A)
MEAN = 4.1862 S.D. = .4663 C.S. = -.0371 C.K. = 3.3941
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0523 B = .9902E+02 LOG(M) = 9.2604
ME= .1051E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3615 B = .6434E+02
LOG(M)= 8.1659 M = .3519E+04
DISTRIBUTION STATISTICS MEAN = 4.0774 S.D. = .5096 C.S. = -.2493

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	10.		15.		14.		14.		14.	
1.150	24.		25.		25.		25.		24.	
1.250	40.		38.		38.		39.		38.	
2.000	61.		59.		60.		60.		60.	
2.330	66.	10.30	65.	11.20	66.	11.50	66.	11.60	66.	11.90
5.000	89.	10.80	92.	12.90	91.	12.30	91.	11.40	92.	12.50
10.000	108.	11.40	115.	15.00	114.	14.50	112.	13.30	114.	13.90
20.000	126.	12.00	139.	17.00	136.	17.30	131.	15.70	135.	16.70
50.000	150.	12.60	172.	19.60	165.	21.30	157.	20.10	163.	21.70
100.000	167.	12.90	198.	21.40	189.	24.30	176.	23.90	183.	26.20
200.000	185.	13.20	226.	23.10	213.	27.30	195.	28.30	205.	30.60
500.000	208.	13.60	264.	25.20	246.	31.20	220.	33.60	233.	37.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BIG OTTER CREEK AT TILLSONBURG 02GC010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I35.0

BIG OTTER CREEK NEAR VIENNA 02GC004

DRAINAGE AREA : 607.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1955 - 1975

SAMPLE STATISTICS
MEAN = 75. S.D. = 47.4 C.S. = 1.7843 C.K. = 6.4783
SAMPLE STATISTICS (LOGS)
MEAN = 4.1629 S.D. = .5681 C.S. = .0348 C.K. = 4.7156
SAMPLE MIN = 17. SAMPLE MAX = 213. N = 21

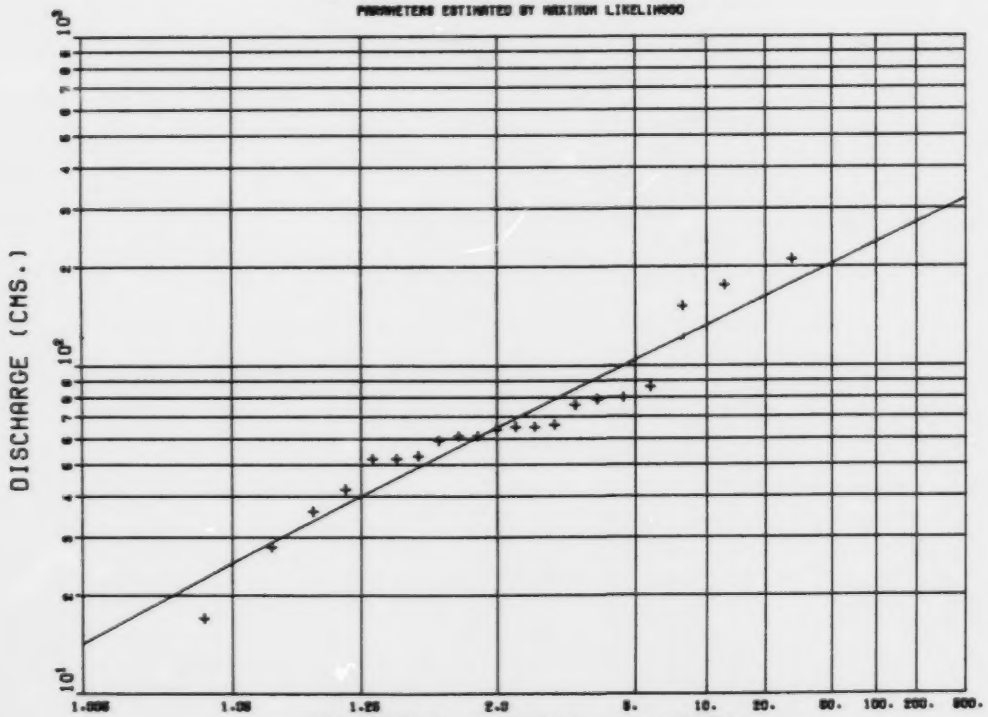
PARAMETERS FOR GUMBEL I A = .934190 U = 56.
PARAMETERS FOR LOGNORMAL M = 4.1629 S = .5681
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2. M = 4.2013 S = .5465
STATISTICS OF LOG(X-A)
MEAN = 4.2013 S.D. = .5465 C.S. = .1253 C.K. = 4.6473
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0699 B = .3300E+04 LOG(P) = ********
ME= .4304E-12

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.015	8.		15.		14.		0.		15.	
1.053	24.		25.		25.		0.		25.	
1.250	42.		40.		40.		0.		41.	
2.000	67.		64.		65.		0.		64.	
2.330	73.	11.10	71.	12.50	71.	13.00	0.	0.00	71.	13.40
5.000	101.	11.50	104.	14.40	104.	14.20	0.	0.00	104.	14.60
10.000	122.	12.10	133.	16.70	132.	16.80	0.	0.00	133.	17.30
20.000	143.	12.60	164.	19.00	162.	20.10	0.	0.00	165.	21.30
50.000	170.	13.20	206.	21.90	203.	24.60	0.	0.00	209.	27.90
100.000	191.	13.50	241.	23.90	236.	28.00	0.	0.00	244.	33.40
200.000	211.	13.80	278.	25.80	271.	31.40	0.	0.00	283.	39.30
500.000	238.	14.10	330.	28.10	323.	35.70	0.	0.00	338.	47.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BIG OTTER CREEK NEAR VIENNA 02GC004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I36.0

BIGHEAD RIVER NEAR MEAFORD 02FB010

DRAINAGE AREA : 293.8 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1958 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	73.	31.	.436	2.767
LN X SERIES	4.20	.45	-.610	4.480
X(MIN)= 19. CMS.		TOTAL SAMPLE SIZE= 25		
X(MAX)= 132. CMS.		NO. OF OUTLIERS= 1		

AFTER REMOVAL OF OUTLIER(S)

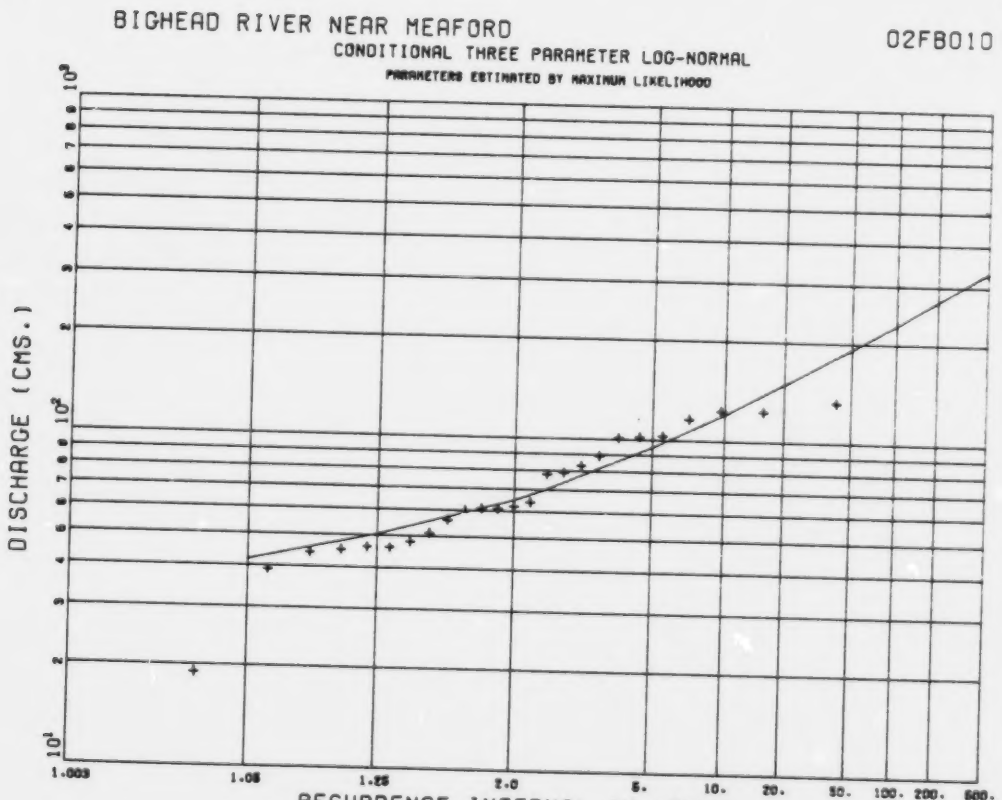
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	76.	29.	.587	2.598
LN X SERIES	4.25	.33	.142	2.263
LN (X-A) SERIES	3.53	.76	-.279	2.621

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 31.9284 Y = 3.5261 S = .7591

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	42.
1.250	.800	50.
2.000	.500	65.
2.330	.429	73.
5.000	.200	95.
10.000	.100	120.
20.000	.050	149.
50.000	.020	192.
100.000	.010	230.
200.000	.005	270.
500.000	.002	331.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I37.0

BLACK CREEK NEAR WESTON 02HC027

DRAINAGE AREA = 59.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

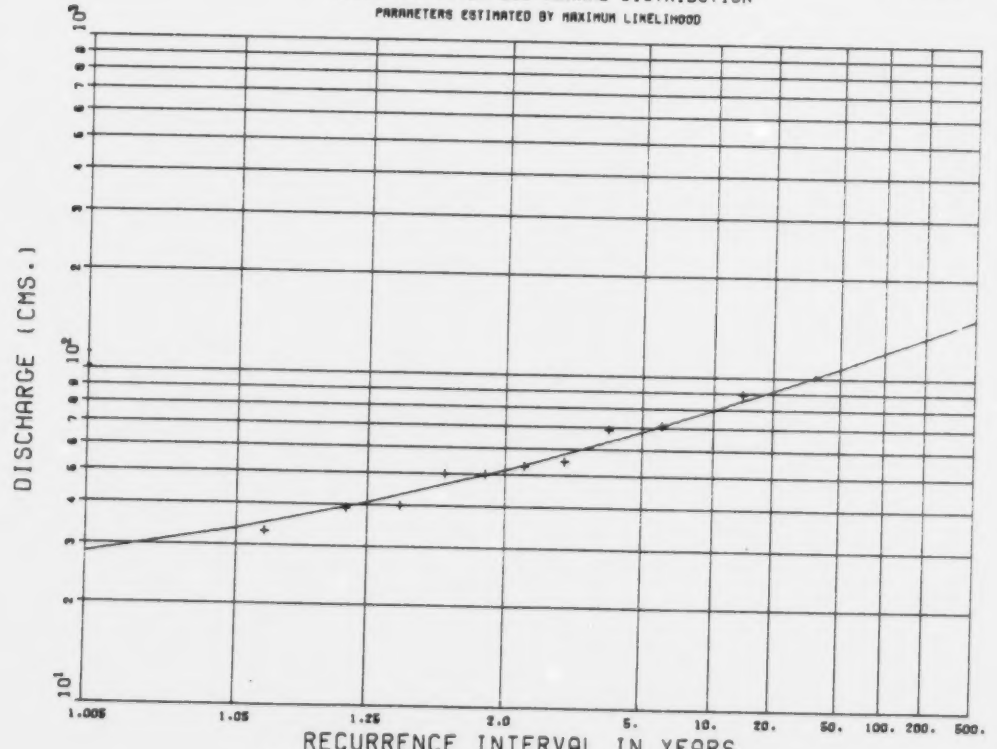
SAMPLE STATISTICS
MEAN = 55. S.D. = 17.1 C.S. = .7953 C.K. = 4.6197
SAMPLE STATISTICS (LOGS)
MEAN = 3.9636 S.D. = .3035 C.S. = .2057 C.K. = 3.8761
SAMPLE MIN = 33. SAMPLE MAX = 89. N = 10

PARAMETERS FOR GUMBEL I A = .379391 U = 47.
PARAMETERS FOR LOGNORMAL M = 3.9636 S = .3035
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 19. M = 3.4821 S = .4860
STATISTICS OF LOG(X-A)
MEAN = 3.4821 S.D. = .4860 C.S. = -.1507 C.K. = 3.9155
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0312 B = .9451E+02 LOG(M) = 1.0127
ME= .2753E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .3676 B = .1356E+02
LOG(M)E= 2.7386 M = .1501E+02
DISTRIBUTION STATISTICS MEAN = 3.9636 S.D. = .2913 C.S. = .4642

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	26.		24.		29.		28.		26.	
1.050	33.		32.		34.		34.		33.	
1.250	41.		41.		41.		41.		41.	
2.000	52.		51.		51.		52.		52.	
2.330	56.	9.35	55.	9.67	54.	10.60	54.	9.98	55.	11.50
5.000	67.	10.90	66.	11.20	68.	12.90	67.	12.00	68.	11.90
10.000	76.	12.30	78.	13.00	80.	16.30	77.	15.20	78.	14.40
20.000	85.	13.40	87.	14.70	91.	22.10	88.	19.30	88.	18.10
50.000	97.	14.60	98.	16.30	107.	29.10	103.	25.70	102.	24.10
100.000	106.	15.40	107.	18.50	120.	33.60	114.	30.30	112.	29.10
200.000	115.	16.00	115.	19.90	133.	35.00	127.	36.40	122.	34.40
500.000	127.	16.80	126.	21.80	151.	40.90	144.	44.00	136.	41.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BLACK CREEK NEAR WESTON 02HC027
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I38.0

BLACK RIVER AT SUTTON 02EC012

DRAINAGE AREA : 324.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 38. S.D. = 13.5 C.S. = .8518 C.K. = 3.8625
SAMPLE STATISTICS (LOGS)
MEAN = 3.5884 S.D. = .3382 C.S. = .3939 C.K. = 2.9388
SAMPLE MIN = 23. SAMPLE MAX = 67. N = 13

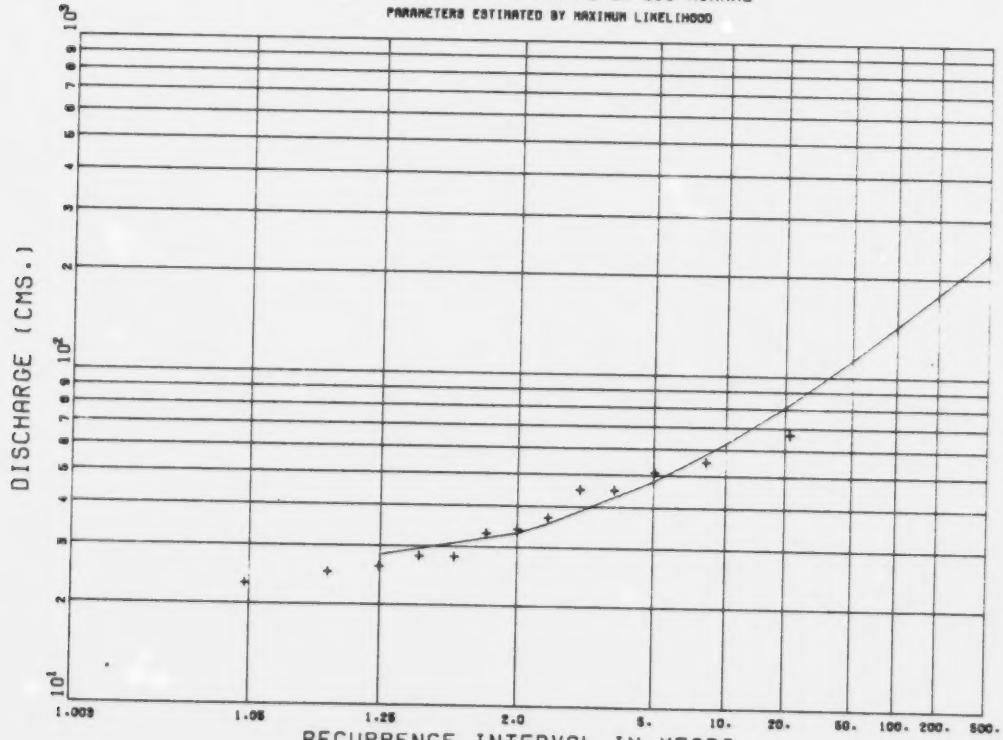
PARAMETERS FOR GUMBEL I A = .173645 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5884 S = .3382
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 21. M = 2.5313 S = .9077
STATISTICS OF LOG(X-A)
MEAN = 2.5313 S.D. = .9077 C.S. = -.3555 C.K. = 3.1211
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0649 B = .2713E+02 LOG(M) = 1.8265
ME= .6212E+01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	16.		15.		22.		0.		17.	
1.050	22.		21.		24.		0.		22.	
1.250	28.		27.		27.		0.		27.	
2.000	36.		36.		33.		0.		35.	
2.330	38.	8.97	39.	9.46	36.	10.80	0.	0.00	38.	13.40
5.000	47.	10.30	48.	10.90	48.	16.60	0.	0.00	48.	12.10
10.000	54.	11.50	56.	12.70	61.	23.00	0.	0.00	57.	15.10
20.000	61.	12.40	63.	14.40	77.	29.80	0.	0.00	65.	19.50
50.000	70.	13.50	73.	16.50	102.	38.70	0.	0.00	78.	26.40
100.000	77.	14.10	80.	18.10	125.	45.20	0.	0.00	87.	32.20
200.000	83.	14.70	87.	19.50	151.	51.60	0.	0.00	98.	38.40
500.000	92.	15.30	96.	21.30	192.	59.30	0.	0.00	112.	46.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BLACK RIVER AT SUTTON 02EC012
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I39.0

BLACK RIVER NEAR ACTINOLITE 02HL003

DRAINAGE AREA : 401.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1965 - 1992

SAMPLE STATISTICS
MEAN = 52. S.D. = 14.7 C.S. = .3525 C.K. = 3.0311
SAMPLE STATISTICS (LOGS)
MEAN = 3.9138 S.D. = .2892 C.S. = -.2551 C.K. = 3.4184
SAMPLE MIN = 27. SAMPLE MAX = 90. N = 19

PARAMETERS FOR GUMBEL I A = .090506 U = 45.
PARAMETERS FOR LOGNORMAL M = 3.9138 S = .2892
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -22. M = 4.2880 S = .1982
STATISTICS OF LOG(X-A)
MEAN = 4.2880 S.D. = .1982 C.S. = -.0439 C.K. = 3.1662
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0369 B = .6145E+32 LOG(M) = 6.1813
ME= .4835E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1667 B = .1913E+02
LOG(M)= 5.1227 M = .1673E+03
DISTRIBUTION STATISTICS MEAN = 3.9138 S.D. = .2839 C.S. = -.4697

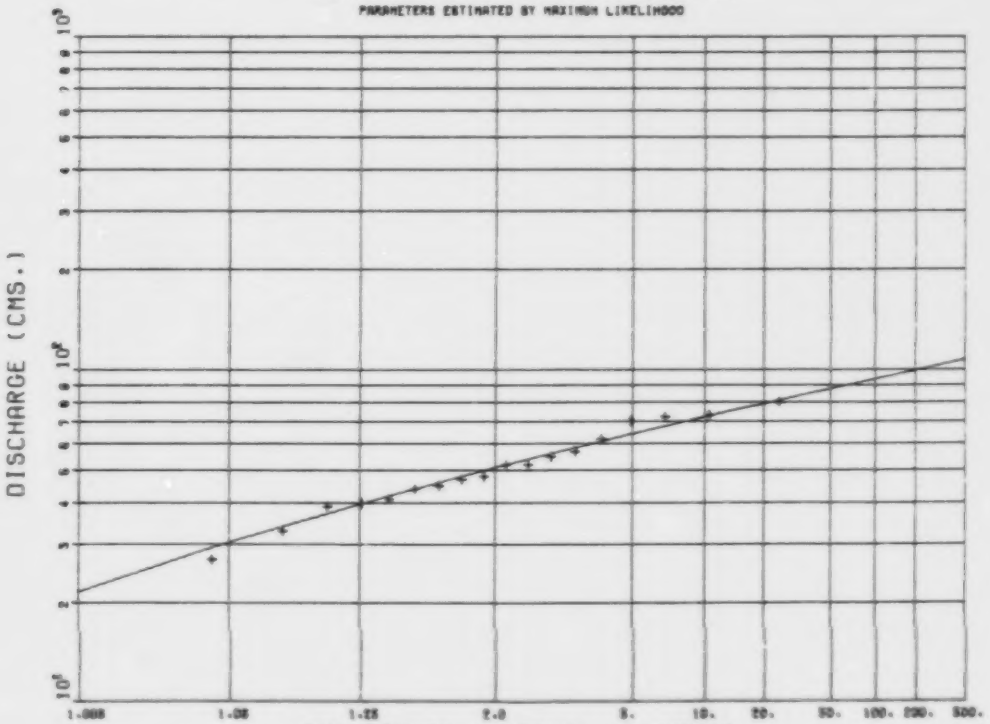
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	25.		24.		22.		21.		22.	
1.050	31.		31.		31.		30.		32.	
1.250	39.		39.		40.		40.		39.	
2.000	50.		50.		51.		51.		51.	
2.330	52.	7.09	53.	6.87	53.	7.10	54.	6.95	53.	7.31
5.000	64.	8.27	64.	7.93	64.	7.93	64.	6.88	64.	7.42
10.000	73.	9.25	73.	9.22	72.	8.45	71.	7.24	72.	8.32
20.000	82.	10.10	81.	10.50	79.	11.10	77.	8.25	79.	9.38
50.000	94.	11.00	91.	12.00	87.	12.60	83.	11.20	87.	11.01
100.000	102.	11.60	98.	13.10	91.	14.60	88.	12.60	93.	15.60
200.000	111.	12.10	106.	14.20	96.	16.60	92.	14.00	99.	18.30
500.000	122.	12.60	115.	15.50	107.	19.30	97.	16.70	105.	22.20

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT

BLACK RIVER NEAR ACTINOLITE 02HL003

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I40.0

BLACK RIVER NEAR MARATHON 02BB002

DRAINAGE AREA : 1980.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	202.	56.	-.478	5.093
LN X SERIES	5.27	.30	-1.309	6.669

X(MIN)= 91. CMS. TOTAL SAMPLE SIZE= 15
X(MAX)= 302. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

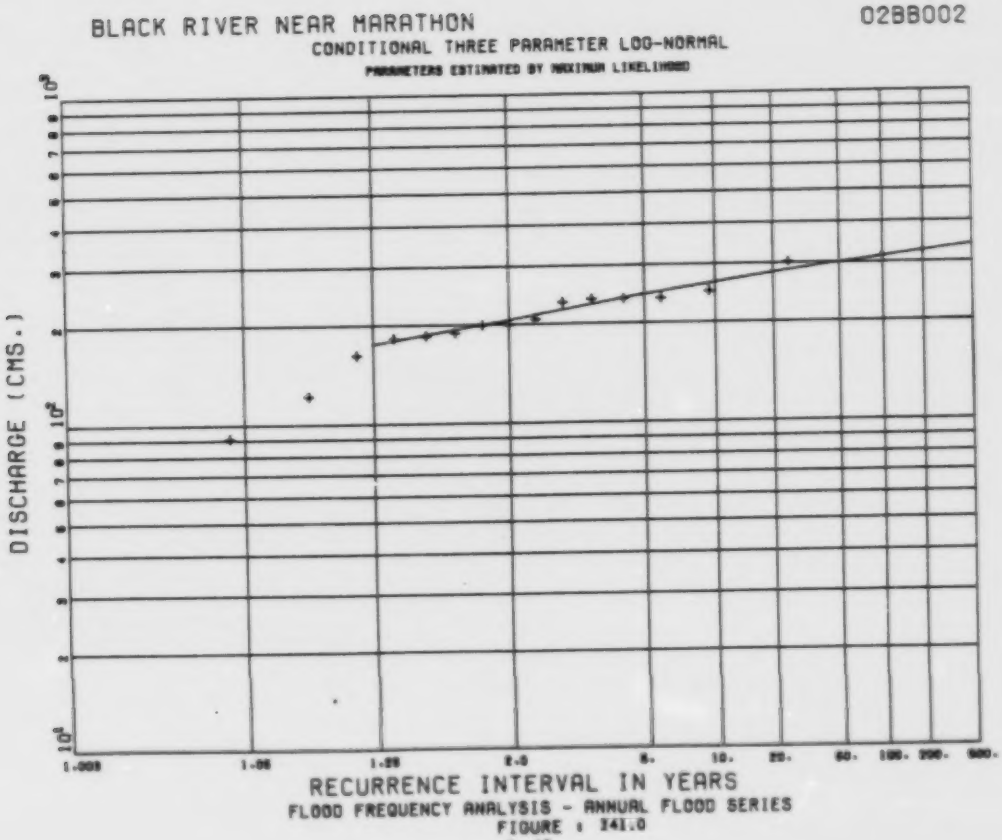
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	210.	44.	-.178	5.415
LN X SERIES	5.33	.22	-.728	6.135
LN (X-A) SERIES	7.64	.02	.002	5.398

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -1874.3531 M = 7.6419 S = .0289

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	175.
2.000	.500	206.
2.330	.429	214.
5.000	.200	244.
10.000	.100	264.
20.000	.050	281.
50.000	.020	300.
100.000	.010	312.
200.000	.005	324.
500.000	.002	338.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I41.0

BLACK RIVER NEAR WASHAGO 02EC002

DRAINAGE AREA = 1520.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1914 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	132.	98.	.176	4.181
LN X SERIES	4.84	.27	-.836	5.258

X(MIN)= 28. CMS. TOTAL SAMPLE SIZE= 67
X(MAX)= 229. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	132.	98.	.176	4.162
LN X SERIES	4.84	.24	-.542	4.218
LN (X-A) SERIES	5.79	.89	.014	3.816

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -195.9640 M = 5.7864 S = .0927

FLOOD FREQUENCY REGIME

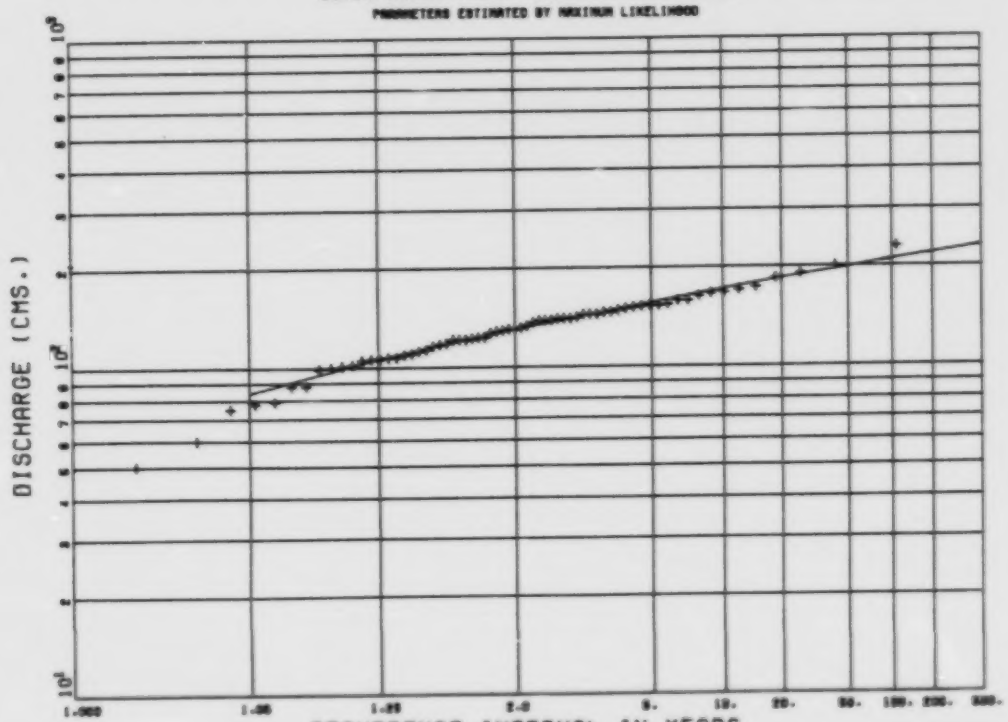
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	44.
1.250	.800	106.
2.000	.500	130.
2.330	.429	135.
5.000	.200	156.
10.000	.100	171.
20.000	.050	184.
50.000	.020	198.
100.000	.010	209.
200.000	.005	218.
500.000	.002	230.

BLACK RIVER NEAR WASHAGO 02EC002

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : 142.0

BLACK STURGEON RIVER AT HIGHWAY NO.17 02AC002

DRAINAGE AREA : 2980.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 119. S.D. = 47.3 C.S. = 1.9333 C.K. = 8.6303
SAMPLE STATISTICS (LOGS)
MEAN = 4.6296 S.D. = .3673 C.S. = .9430 C.K. = 5.2804
SAMPLE MIN = 64. SAMPLE MAX = 237. N = 12

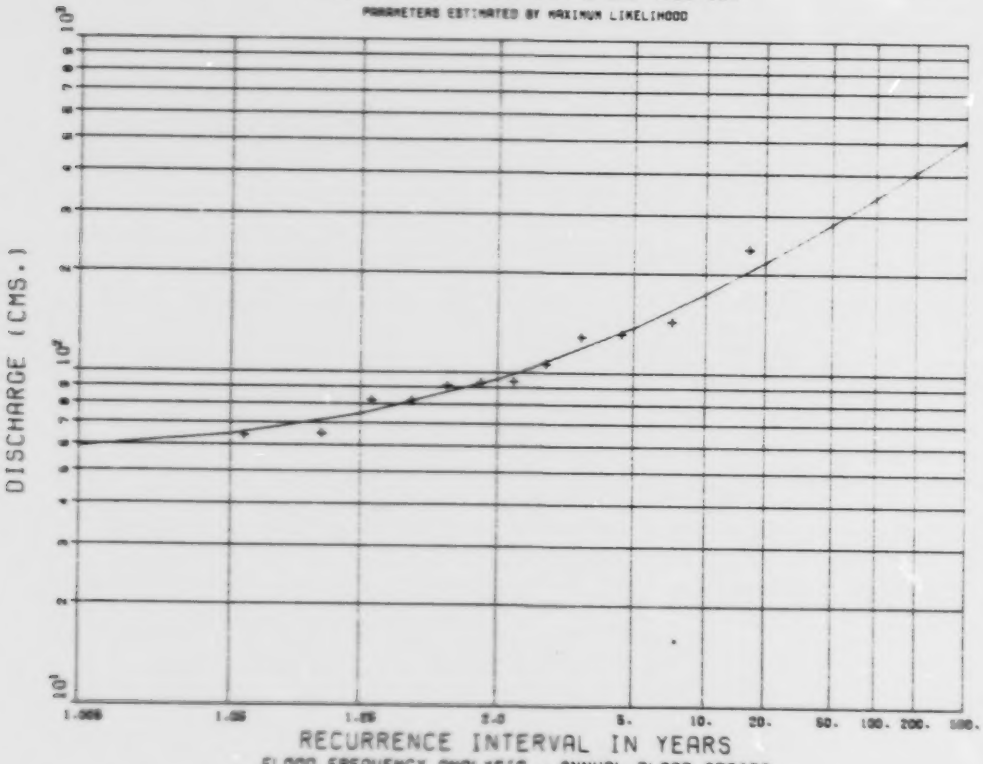
PARAMETERS FOR GUMBEL I A = .97E144 U = 31.
PARAMETERS FOR LOGNORMAL M = 4.6296 S = .3673
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 54. M = 3.7185 S = .8351
STATISTICS OF LOG(X-A)
MEAN = 3.7185 S.D. = .8351 C.S. = -.1947 C.K. = 4.1110
PARAMETERS FOR LOG PEARSON III (Y MOMENTS A = .1732 B = .4498E+01 LOG(M) = 3.8535
ME= .4702E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	44.		40.		59.		0.		54.	
1.050	60.		56.		64.		0.		63.	
1.250	78.		75.		74.		0.		75.	
2.000	102.		102.		95.		0.		97.	
2.330	108.	9.68	109.	10.70	102.	11.70	0.	0.00	103.	12.70
5.000	134.	11.10	140.	12.30	137.	17.00	0.	0.00	136.	15.40
10.000	155.	12.20	164.	14.30	174.	23.00	0.	0.00	167.	20.60
20.000	176.	13.20	188.	16.30	217.	29.50	0.	0.00	203.	28.50
50.000	202.	14.30	218.	18.70	283.	38.10	0.	0.00	258.	41.70
100.000	222.	15.00	241.	20.40	341.	44.40	0.	0.00	308.	52.90
200.000	242.	15.50	264.	22.00	408.	50.40	0.	0.00	365.	65.10
500.000	268.	16.20	295.	24.10	510.	58.10	0.	0.00	454.	82.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BLACK STURGEON RIVER AT HIGHWAY NO.17 02AC002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I43.0

BLACKWATER RIVER AT BEARDMORE 02AD010

DRAINAGE AREA : 653.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1981

SAMPLE STATISTICS
MEAN = 51. S.D. = 13.0 C.S. = -.7078 C.K. = 6.2599
SAMPLE STATISTICS (LOGS)
MEAN = 3.9020 S.D. = .3004 C.S. = -1.6506 C.K. = 4.1115
SAMPLE MIN = 24. SAMPLE MAX = 73. N = 10

PARAMETERS FOR GUMBEL I A = .17347E U = 45.
PARAMETERS FOR LOGNORMAL M = 3.9020 S = .3004

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2473 B = .1468E+01 LOG(M) = 4.2660
ME= .7123E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1566 B = .3161E+01
LOG(M)= 4.3875 M = .2044E+02
DISTRIBUTION STATISTICS MEAN = 3.9020 S.D. = .2757 C.S. =-1.1367

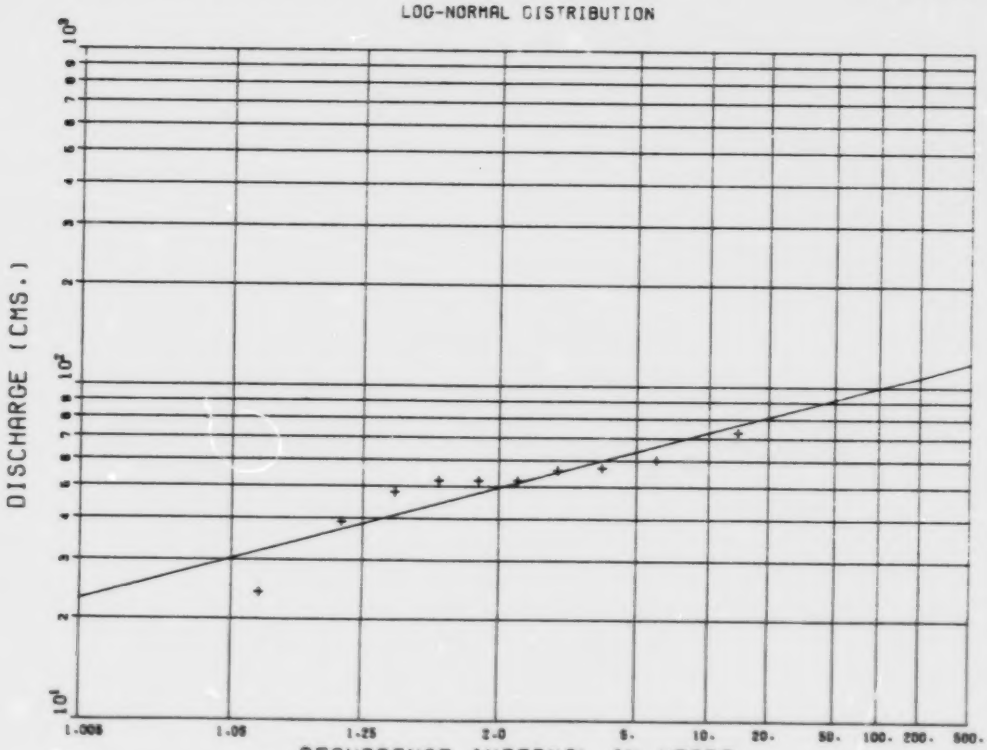
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	22.		23.		0.		18.		0.	
1.050	35.		36.		0.		29.		0.	
1.250	38.		39.		0.		40.		0.	
2.000	50.		50.		0.		52.		0.	
2.330	53.	10.40	52.	9.57	0.	0.00	54.	7.84	0.	0.00
5.000	65.	11.20	64.	11.10	0.	0.00	63.	6.65	0.	0.00
10.000	76.	13.20	74.	12.80	0.	0.00	67.	6.22	0.	0.00
20.000	85.	14.30	81.	14.60	0.	0.00	70.	5.87	0.	0.00
50.000	96.	15.60	92.	16.80	0.	0.00	73.	5.53	0.	0.00
100.000	107.	16.20	100.	18.30	0.	0.00	75.	5.36	0.	0.00
200.000	117.	16.60	107.	19.70	0.	0.00	76.	5.27	0.	0.00
500.000	129.	17.20	116.	21.60	0.	0.00	78.	5.25	0.	0.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

DATA FAILED NONPARAMETRIC TESTS

BLACKWATER RIVER AT BEARDMORE 02AD010

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I44.0

BLANCHE RIVER ABOVE ENGLEHART 02JC008

DRAINAGE AREA = 1780.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

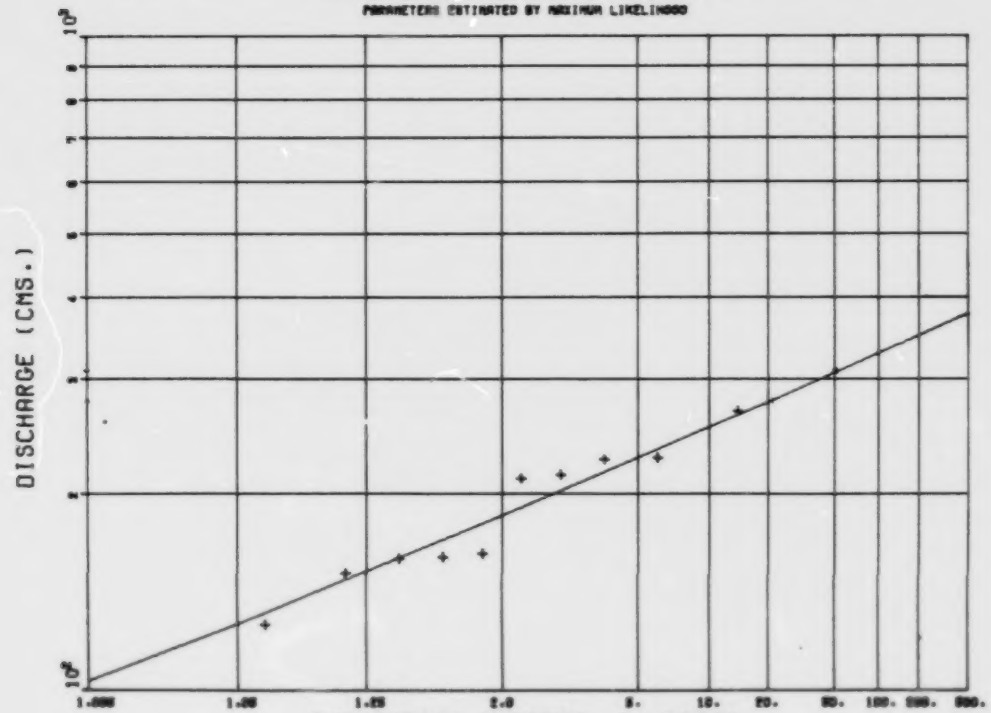
SAMPLE STATISTICS
MEAN = 190. S.D. = 44.8 C.S. = .2682 C.K. = 3.3861
SAMPLE STATISTICS (LOGS)
MEAN = 5.2240 S.D. = .2376 C.S. = -.0676 C.K. = 3.2719
SAMPLE MIN = 126. SAMPLE MAX = 268. N = 10

PARAMETERS FOR GUMBEL I A = .027501 U = 170.
PARAMETERS FOR LOGNORMAL M = 5.2240 S = .2376
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 22. M = 5.0958 S = .2700
STATISTICS OF LOG(X-A)
MEAN = 5.0958 S.D. = .2700 C.S. = -.1149 C.K. = 3.3079
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0000 B = .8750E+03 LOG(P) = 12.2519
ME= .2094E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1452 B = .2548E+02
LOG(M)F= 6.3745 M = .5867E+03
DISTRIBUTION STATISTICS MEAN = 5.2240 S.D. = .2279 C.S. = -.3962

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	109.		101.		103.		95.		99.	
1.050	129.		126.		126.		125.		125.	
1.250	152.		152.		152.		154.		152.	
2.000	183.		186.		185.		188.		186.	
2.330	191.	7.65	194.	7.57	191.	8.12	196.	7.56	194.	8.11
5.000	224.	9.24	227.	8.74	227.	8.99	226.	7.50	227.	9.63
10.000	252.	10.60	252.	10.10	253.	10.80	246.	8.13	254.	10.90
20.000	278.	11.70	274.	11.50	276.	13.20	263.	9.40	279.	12.20
50.000	312.	13.00	302.	13.20	306.	16.90	282.	11.80	300.	15.90
100.000	337.	13.80	323.	14.50	328.	19.80	295.	13.90	319.	19.00
200.000	362.	14.50	342.	15.60	349.	22.80	307.	16.20	337.	22.30
500.000	396.	15.30	368.	17.00	377.	26.80	322.	19.50	361.	26.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BLANCHE RIVER ABOVE ENGLEHART 02JC008
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE # 145.0

BLANCHE RIVER AT SWASTIKA 02JC009

DRAINAGE AREA 251.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1968 - 1977

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	19.	5.	1.607	3.638
LN X SERIES	2.92	.22	1.137	7.021

X(MIN)= 14. CMS. TOTAL SAMPLE SIZE= 10
X(MAX)= 30. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	20.	5.	1.581	3.351
LN X SERIES	2.95	.21	1.314	7.098
LN (X-A) SERIES	1.48	.84	-.141	6.495

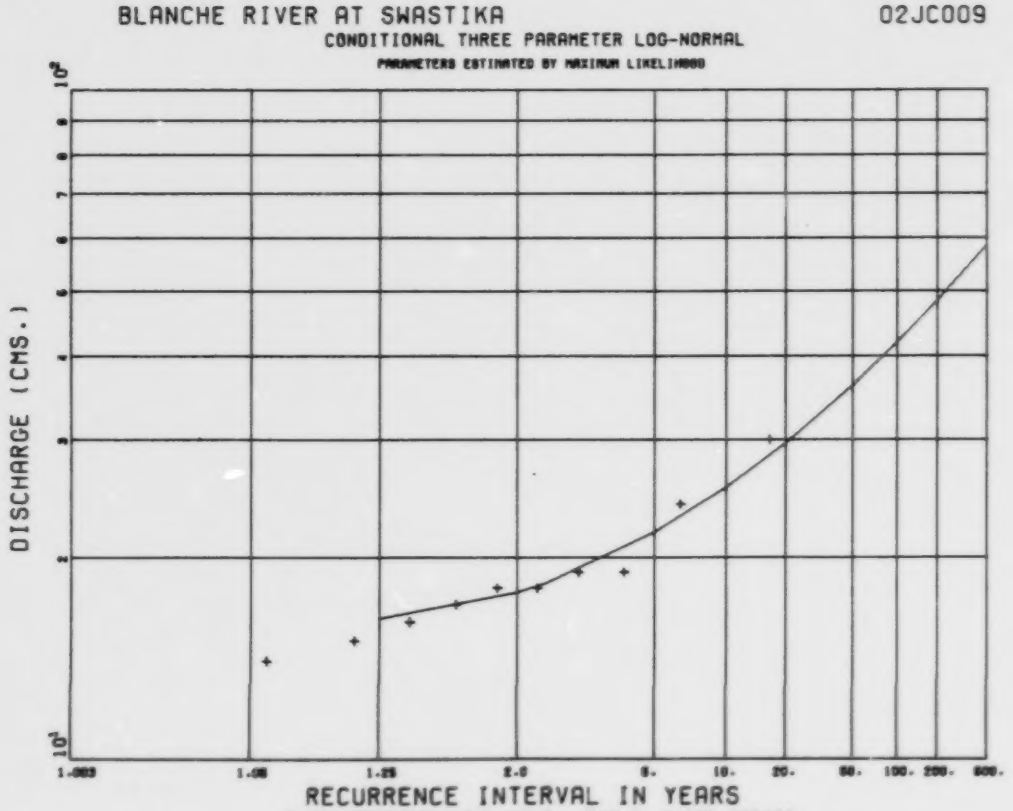
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 14.0971 M = 1.3965 S = .8427

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	16.
2.000	.500	19.
2.330	.429	19.
5.000	.200	22.
10.000	.100	25.
20.000	.050	30.
50.000	.020	36.
100.000	.010	42.
200.000	.005	48.
500.000	.002	59.

DATA FAILED NONPARAMETRIC TESTS



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I46.0

BLCOMFIELD CREEK AT BLCOMFIELD 02HE001

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 13.9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 415. S.D. = 156.8 C.S. = -.0266 C.K. = 2.6393
SAMPLE STATISTICS (LOGS)
MEAN = 5.9532 S.D. = .4237 C.S. = -.6381 C.K. = 3.6218
SAMPLE MIN = 180. SAMPLE MAX = 644. N = 13

PARAMETERS FOR GUMBEL I A = .007307 U = 340.
PARAMETERS FOR LOGNORMAL M = 5.9532 S = .4237

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1352 B = .9823E+01 LOG(M) = 7.2811
ME= .1453E+04

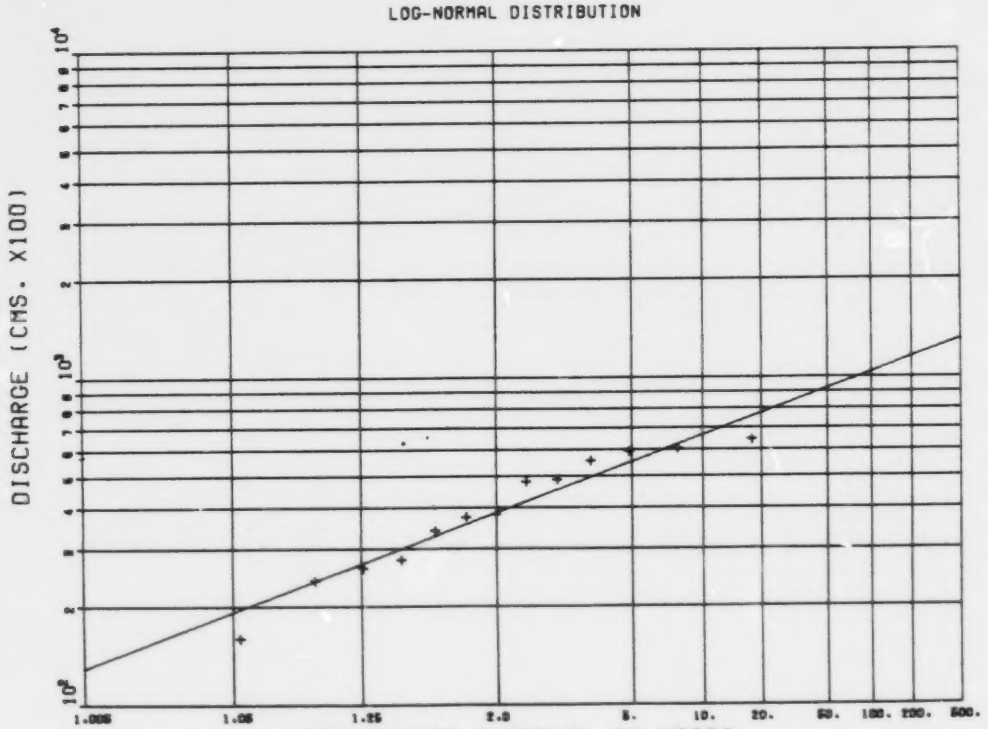
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	112.		129.		0.		0.		100.	
1.050	188.		192.		0.		0.		179.	
1.250	275.		269.		0.		0.		275.	
2.000	391.		385.		0.		0.		403.	
2.330	420.	11.50	415.	11.80	0.	0.00	0.	0.00	433.	12.70
5.000	546.	13.50	550.	13.70	0.	0.00	0.	0.00	553.	11.30
10.000	648.	13.50	663.	15.90	0.	0.00	0.	0.00	636.	11.90
20.000	747.	14.40	773.	18.00	0.	0.00	0.	0.00	710.	14.60
50.000	874.	15.30	919.	20.70	0.	0.00	0.	0.00	792.	20.10
100.000	970.	15.80	1030.	22.60	0.	0.00	0.	0.00	846.	24.80
200.000	1070.	16.30	1150.	24.40	0.	0.00	0.	0.00	895.	29.80
500.000	1190.	16.80	1300.	26.70	0.	0.00	0.	0.00	953.	36.50

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

BLOOMFIELD CREEK AT BLOOMFIELD 02HE001

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I47.0

BLUE SPRINGS CREEK NEAR EDEN MILLS 02GA031

DRAINAGE AREA : 44.5 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1969 - 1982

SAMPLE STATISTICS
MEAN = 5. S.D. = 2.2 C.S. = .1133 C.K. = 2.8536
SAMPLE STATISTICS (LOGS)
MEAN = 1.6007 S.D. = .4615 C.S. = -.5253 C.K. = 3.1568
SAMPLE MIN = 2. SAMPLE MAX = 9. N = 14

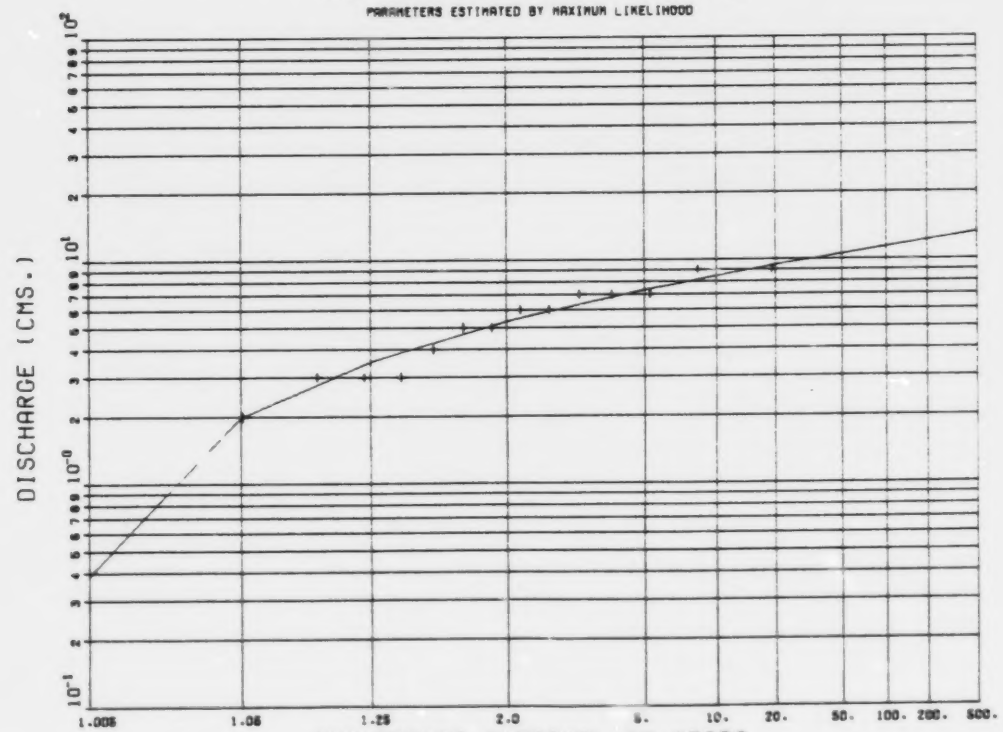
PARAMETERS FOR GUMBEL I A = .521509 U = 4.
PARAMETERS FOR LOGNORMAL M = 1.6007 S = .4615
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -12. M = 2.8648 S = .1274
STATISTICS OF LOG(X-A)
MEAN = 2.8648 S.D. = .1274 C.S. = -.0614 C.K. = 2.7414
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1212 B = .1449E+02 LOG(M) = 3.3575
ME= .2872E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		2.		3.		0.		1.	
1.050	2.		2.		2.		0.		2.	
1.250	3.		3.		4.		0.		3.	
2.000	5.		5.		5.		0.		5.	
2.330	5.	11.80	5.	12.40	6.	11.60	0.	0.00	6.	13.30
5.000	7.	12.70	7.	14.40	7.	10.70	0.	0.00	7.	12.30
10.000	9.	13.60	9.	16.60	9.	11.50	0.	0.00	9.	13.20
20.000	10.	14.40	11.	18.90	9.	13.20	0.	0.00	10.	15.90
50.000	12.	15.20	13.	21.70	11.	16.00	0.	0.00	11.	21.30
100.000	13.	15.70	15.	23.70	11.	18.20	0.	0.00	12.	26.10
200.000	15.	16.10	16.	25.60	12.	20.40	0.	0.00	13.	31.10
500.000	16.	16.60	19.	28.00	13.	23.30	0.	0.00	14.	38.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BLUE SPRINGS CREEK NEAR EDEN MILLS 02GA031
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I48.0

BONNECHERE RIVER NEAR CASTLEFORD (1922 - 1957) 02KC009

DRAINAGE AREA : 2388.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1922 - 1957

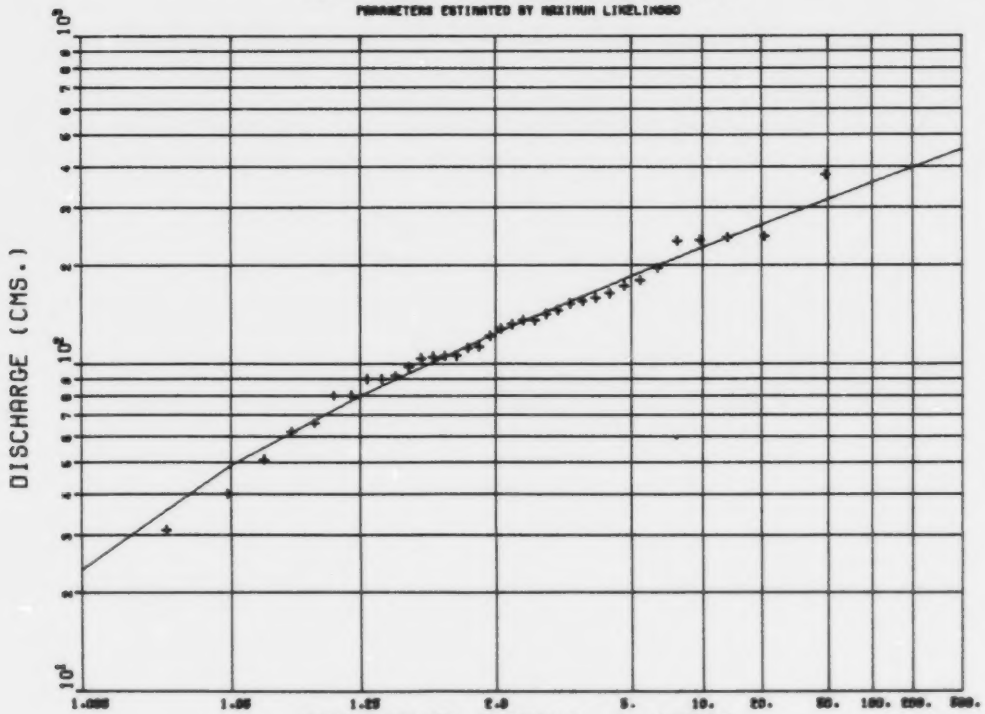
SAMPLE STATISTICS MEAN = 136. S.D. = 69.4 C.S. = 1.3622 C.K. = 6.2911
SAMPLE STATISTICS (LOGS) MEAN = 4.7878 S.D. = .5199 C.S. = -.4223 C.K. = 3.9783
SAMPLE MIN = 31. SAMPLE MAX = 378. N = 36

PARAMETERS FOR GUMBEL I A = .019444 U = 106.
PARAMETERS FOR LOGNORMAL M = 4.7878 S = .5199
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -35. M = 5.3682 S = .3876
STATISTICS OF LOG(X-A) MEAN = 5.0582 S.D. = .3876 C.S. = .0143 C.K. = 3.6417
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1098 B = .2243E+02 LOG(M) = 7.2500
ME= .1408E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0832 B = .3780E+02
LOG(M)= 7.9321 M = .2785E+04
DISTRIBUTION STATISTICS MEAN = 4.7878 S.D. = .5114 C.S. = -.3253

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	20.		32.		23.		28.		26.	
1.050	49.		51.		49.		50.		48.	
1.250	81.		78.		80.		79.		79.	
2.000	125.		120.		124.		121.		124.	
2.330	135.	8.03	132.	8.73	135.	8.67	135.	9.01	136.	9.31
5.000	183.	6.45	186.	10.10	185.	8.95	186.	9.08	187.	8.96
10.000	221.	8.95	234.	11.70	226.	10.40	227.	9.99	227.	9.74
20.000	258.	9.38	282.	13.30	265.	12.30	265.	11.70	264.	11.70
50.000	306.	9.84	349.	15.30	317.	15.00	313.	14.80	310.	13.40
100.000	342.	10.10	402.	16.70	356.	17.20	349.	17.60	342.	16.60
200.000	378.	10.40	458.	18.00	396.	19.30	384.	20.50	374.	22.10
500.000	425.	10.60	536.	19.70	450.	22.00	429.	24.60	414.	26.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

BONNECHERE RIVER NEAR CASTLEFORD (1922 - 1957) 02KC009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I49.0

BONNECHERE RIVER NEAR CASTLEFORD (1966 - 1982) 02KC009

DRAINAGE AREA : 2380.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1966 - 1982

SAMPLE STATISTICS
MEAN = 166. S.D. = 46.5 C.S. = -.5186 C.K. = 3.3753
SAMPLE STATISTICS (LOGS)
MEAN = 5.0695 S.D. = .3229 C.S. = -1.0355 C.K. = 3.9662
SAMPLE MIN = 78. SAMPLE MAX = 234. N = 17

PARAMETERS FOR GUMBEL I A = .021691 U = 143.
PARAMETERS FOR LOGNORMAL M = 5.0695 S = .3229

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1472 B = .3728E+01 LOG(M) = 5.6930
ME= .2965E+03

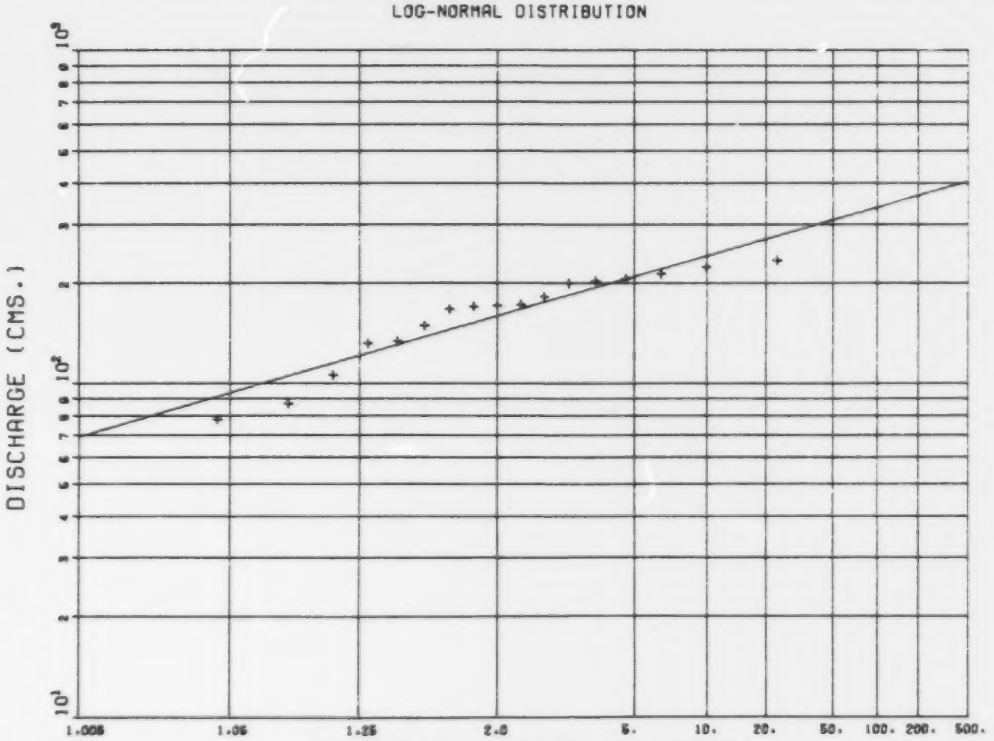
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	66.		69.		0.		0.		51.	
1.050	92.		94.		0.		0.		87.	
1.250	121.		121.		0.		0.		125.	
2.000	160.		159.		0.		0.		164.	
2.330	169.	8.37	169.	7.89	0.	0.00	0.	0.00	177.	8.62
5.000	212.	9.51	209.	9.12	0.	0.00	0.	0.00	219.	6.45
10.000	247.	10.50	241.	10.60	0.	0.00	0.	0.00	228.	7.01
20.000	280.	11.30	271.	12.00	0.	0.00	0.	0.00	243.	9.97
50.000	323.	12.20	309.	13.80	0.	0.00	0.	0.00	257.	15.00
100.000	355.	12.70	337.	15.10	0.	0.00	0.	0.00	265.	18.80
200.000	387.	13.31	366.	16.30	0.	0.00	0.	0.00	271.	22.50
500.000	429.	13.70	403.	17.80	0.	0.00	0.	0.00	278.	27.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BONNECHERE RIVER NEAR CASTLEFORD (1966 - 1982) 02KC009

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 149.1

BOWMANVILLE CK.(HAYDON TRIB.) NEAR HAMPTON 02HD214

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

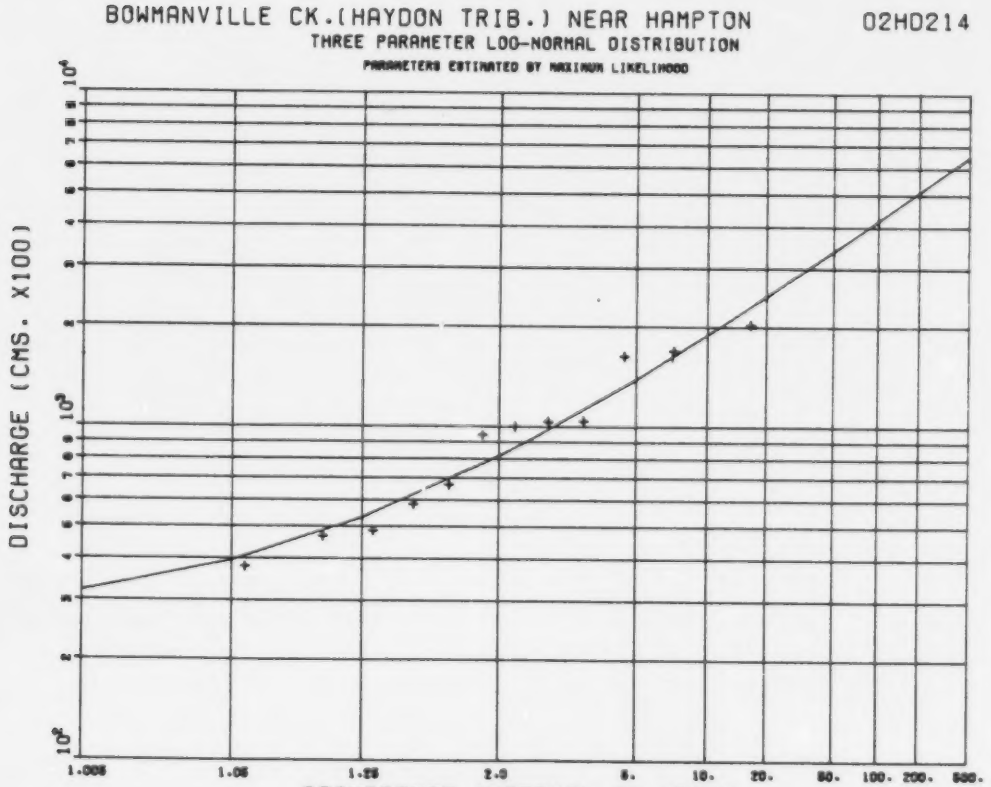
DRAINAGE AREA = 26.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1978

SAMPLE STATISTICS
MEAN = 995. S.D. = 535.3 C.S. = .7605 C.K. = 3.5767
SAMPLE STATISTICS (LOGS)
MEAN = 6.7686 S.D. = .5470 C.S. = .0357 C.K. = 2.4936
SAMPLE MIN = 378. SAMPLE MAX = 2229. N = 12

PARAMETERS FOR GUMBEL I A = .012571 U = 758.
PARAMETERS FOR LOGNORMAL P = 6.7686 S = .5470
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 253. M = 6.3275 S = .8363
STATISTICS OF LOG(X-A)
MEAN = 6.3275 S.D. = .8363 C.S. = -.3537 C.K. = 3.1638
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0098 B = .3135E+04 LOG(P) = *******
ME= .4371E-10
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0746 B = .4989E+02
LOG(P)F= 3.1478 M = .2107E+02
DISTRIBUTION STATISTICS MEAN = 6.7686 S.D. = .5268 C.S. = .2832

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	109.		213.		318.		257.		217.	
1.050	325.		354.		394.		342.		356.	
1.250	573.		549.		530.		555.		544.	
2.000	941.		875.		811.		849.		867.	
2.330	983.	14.50	959.	15.90	902.	18.00	933.	16.50	956.	17.10
5.000	1340.	15.10	1380.	18.40	1380.	23.00	1340.	19.10	1380.	18.60
10.000	1630.	15.90	1750.	21.30	1890.	29.00	1730.	23.50	1760.	22.10
20.000	1910.	16.80	2140.	24.20	2477.	35.30	2150.	29.60	2151.	27.10
50.000	2280.	17.40	2680.	27.80	3370.	43.60	2780.	39.10	2701.	35.50
100.000	2550.	17.80	3110.	30.40	4170.	49.60	3300.	47.00	3150.	42.60
200.000	2820.	18.20	3560.	32.80	5080.	55.30	3930.	55.40	3630.	50.10
500.000	3180.	18.80	4200.	35.80	6480.	62.50	4770.	67.00	4310.	60.60

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 150.0

BOWMANVILLE CREEK AT BOWMANVILLE 02HD006

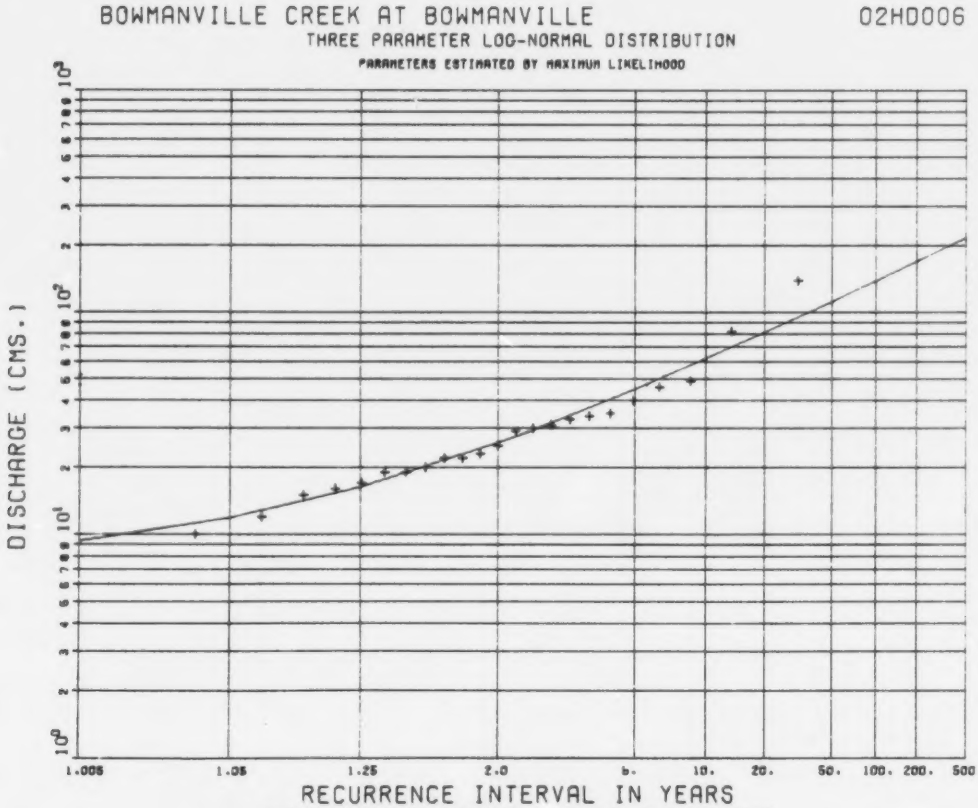
DRAINAGE AREA : 82.9 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1960 - 1982

SAMPLE STATISTICS
MEAN = 33. S.D. = 27.8 C.S. = 2.9040 C.K. = 13.1897
SAMPLE STATISTICS (LOGS)
MEAN = 3.3367 S.D. = .5968 C.S. = .9104 C.K. = 4.3384
SAMPLE MIN = 10. SAMPLE MAX = 139. N = 23

PARAMETERS FOR GUMBEL I A = .373772 U = 24.
PARAMETERS FOR LOGNORMAL M = 3.3067 S = .5968
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 7. M = 2.9092 S = .8454
STATISTICS OF LOG(X-A)
MEAN = 2.9082 S.D. = .8454 C.S. = .0924 C.K. = 4.3454
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2717 B = .4926E+01 LOG(M) = 1.9966
ME= .7357E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .2191 S = .7013E+01
LOG(M)F= 1.7692 M = .5866E+01
DISTRIBUTION STATISTICS MEAN = 3.3067 S.D. = .5804 C.S. = .7549

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.
1.005	1.		6.		3.		9.		10.	
1.050	9.		10.		12.		12.		12.	
1.250	17.		17.		16.		17.		16.	
2.000	29.		27.		26.		25.		25.	
2.330	32.	11.30	30.	12.50	29.	11.60	28.	12.30	28.	14.9
5.000	44.	11.50	45.	14.50	45.	17.20	43.	16.70	43.	17.9
10.000	54.	12.00	59.	16.80	61.	21.60	59.	21.90	61.	23.9
20.000	64.	12.50	73.	19.10	81.	26.10	79.	28.20	83.	33.
50.000	77.	13.00	93.	21.90	111.	32.10	112.	37.50	122.	48.0
100.000	86.	13.30	109.	24.00	134.	36.40	144.	45.00	161.	60.9
200.000	96.	13.50	127.	25.90	164.	40.60	183.	52.90	211.	74.7
500.000	109.	13.80	152.	28.20	215.	45.80	250.	63.90	299.	94.2

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCEN



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I51.0

BOWMANVILLE CREEK NEAR ENFIELD 02HD211

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. ARE NOT AFFECTED)

DRAINAGE AREA = 6.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1969 - 1978

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	214.	120.	1.688	10.704
LN X SERIES	5.23	.58	-.725	8.976

X(MIN)= 52.CMS.(*100) TOTAL SAMPLE SIZE= 10
X(MAX)= 509.CMS.(*100) NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	232.	112.	2.252	12.993
LN X SERIES	5.37	.38	1.559	9.277
LN (X-A) SERIES	5.01	.51	1.319	8.148

CONDITIONAL PROBABILITY FUNCTION (MOMENTS)

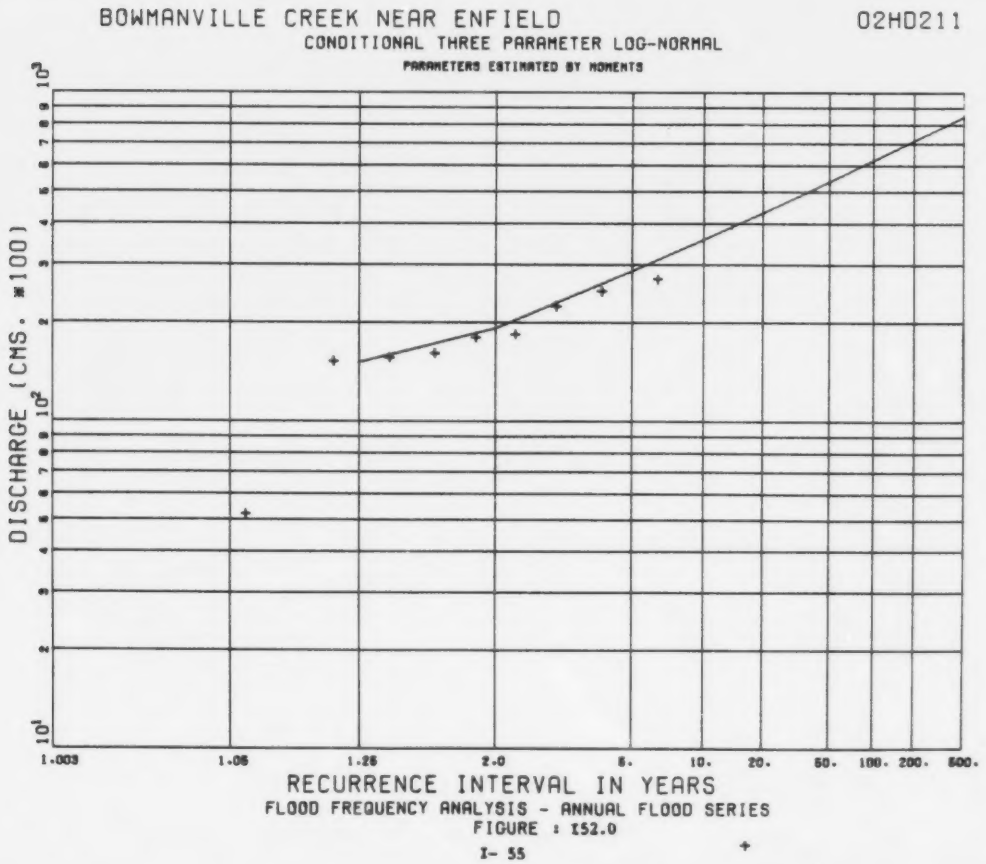
PARAMETERS A = 60.7329 M = 4.9628 S = .5985

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MOMENTS)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	.997	-
1.050	.952	-
1.250	.800	151.
2.000	.500	192.
2.330	.429	209.
5.000	.200	287.
10.000	.100	358.
20.000	.050	432.
50.000	.020	537.
100.000	.010	623.
200.000	.005	715.
500.000	.002	846.

NO LOW OUTLIER SPECIFIED FOR STATION- 02KA005



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I52.0

BOYLE DRAIN NEAR ATWOOD 02FE010

DRAINAGE AREA : 197.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1979

SAMPLE STATISTICS
MEAN = 60. S.D. = 23.3 C.S. = .8579 C.K. = 4.3828
SAMPLE STATISTICS (LOGS)
MEAN = 4.0310 S.D. = .3798 C.S. = .0844 C.K. = 3.6325
SAMPLE MIN = 30. SAMPLE MAX = 109. N = 12

PARAMETERS FOR GUMBEL I A = .057763 U = 50.
PARAMETERS FOR LOGNORMAL M = 4.0310 S = .3798
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. M = 3.7890 S = .4819
STATISTICS OF LOG(X-A)
MEAN = 3.7890 S.D. = .4819 C.S. = -.1284 C.K. = 3.6809
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0160 B = .5621E+03 LOG(M) =-4.9738
ME= .6917E-02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0290 B = .1576E+03
LOG(M)F= -.5380 M = .5835E+00
DISTRIBUTION STATISTICS MEAN = 4.0310 S.D. = .3640 C.S. = .1593

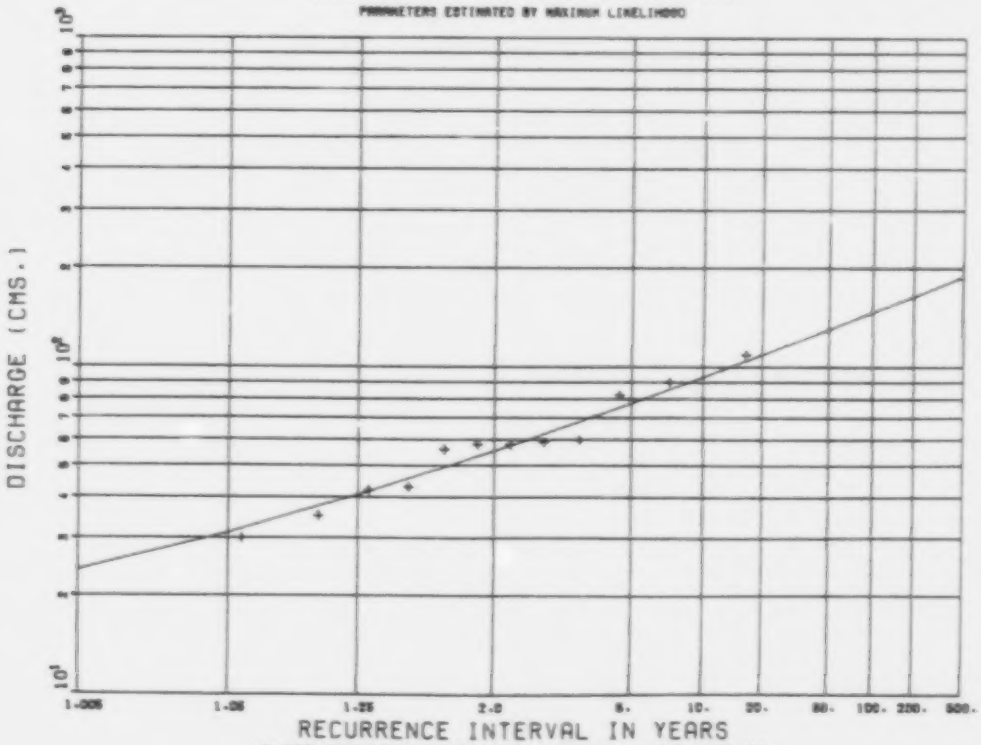
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	21.		21.		24.		23.		22.	
1.050	31.		30.		31.		32.		30.	
1.250	42.		41.		41.		41.		41.	
2.000	56.		56.		55.		56.		56.	
2.330	60.	10.60	60.	11.10	59.	12.00	60.	11.40	60.	11.90
5.000	76.	11.90	78.	12.80	78.	13.90	76.	12.80	77.	13.10
10.000	89.	13.00	92.	14.80	93.	17.00	90.	15.50	92.	15.60
20.000	101.	13.90	105.	16.80	109.	20.80	104.	19.30	105.	19.40
50.000	117.	15.00	123.	19.30	130.	26.20	123.	25.40	125.	25.40
100.000	130.	15.60	136.	21.10	147.	30.40	137.	30.50	139.	30.60
200.000	142.	16.10	150.	22.80	164.	34.50	152.	35.90	154.	36.00
500.000	157.	16.70	168.	24.90	188.	39.90	173.	43.40	175.	43.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BOYLE DRAIN NEAR ATWOOD 02FE010

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I53.0

BOYNE RIVER AT EARL ROWE PARK 02ED102

DRAINAGE AREA = 211.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1969 - 1982

SAMPLE STATISTICS
MEAN = 51. S.D. = 31.2 C.S. = 1.2460 C.K. = 4.3440
SAMPLE STATISTICS (LOGS)
MEAN = 3.7927 S.D. = .5451 C.S. = .6273 C.K. = 3.0925
SAMPLE MIN = 23. SAMPLE MAX = 122. N = 14

PARAMETERS FOR GUMBEL I A = .851185 U = 38.
PARAMETERS FOR LOGNORMAL M = 3.7927 S = .5451
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 22. M = 2.6708 S = 1.4289
STATISTICS OF LOG(X-A)
MEAN = 2.6708 S.D. = 1.4289 C.S. = -.5781 C.K. = 3.4931
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1710 B = .1016E+02 LOG(M) = 2.0548
ME= .7885E+01

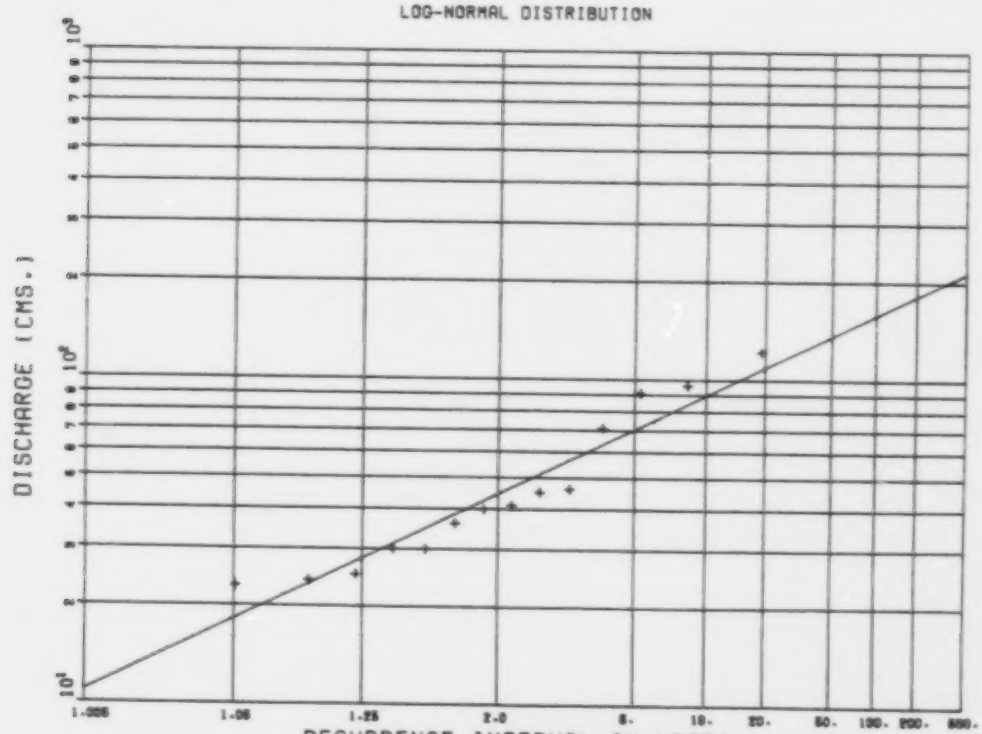
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6.		11.		23.		0.		15.	
1.050	17.		18.		24.		0.		20.	
1.250	29.		28.		27.		0.		28.	
2.000	46.		44.		37.		0.		42.	
2.333	50.	13.30	49.	14.70	41.	17.70	0.	0.00	46.	16.60
5.000	66.	13.90	70.	17.80	70.	30.50	0.	0.00	69.	19.80
10.000	83.	14.70	89.	19.70	112.	41.00	0.	0.00	92.	25.70
20.000	96.	15.30	109.	22.30	174.	52.20	0.	0.00	116.	34.10
50.000	115.	16.00	136.	25.70	294.	64.20	0.	0.00	162.	47.70
100.000	128.	16.50	158.	28.00	423.	72.40	0.	0.00	207.	59.20
200.000	142.	16.80	181.	30.30	596.	79.60	0.	0.00	269.	71.40
500.000	160.	17.20	213.	33.10	907.	88.80	0.	0.00	326.	88.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BOYNE RIVER AT EARL ROWE PARK 02ED102

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 154.0

BRONTE CREEK NEAR ZIMMERMAN 02HB011

DRAINAGE AREA : 235.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1954 - 1982

SAMPLE STATISTICS
MEAN = 24. S.D. = 5.9 C.S. = -.0622 C.K. = 2.9658
SAMPLE STATISTICS (LOGS)
MEAN = 3.1406 S.D. = .2609 C.S. = -.5084 C.K. = 2.9747
SAMPLE MIN = 14. SAMPLE MAX = 34. N = 19

PARAMETERS FOR GUMBEL I A = .196881 U = 21.
PARAMETERS FOR LOGNORMAL M = 3.1406 S = .2609

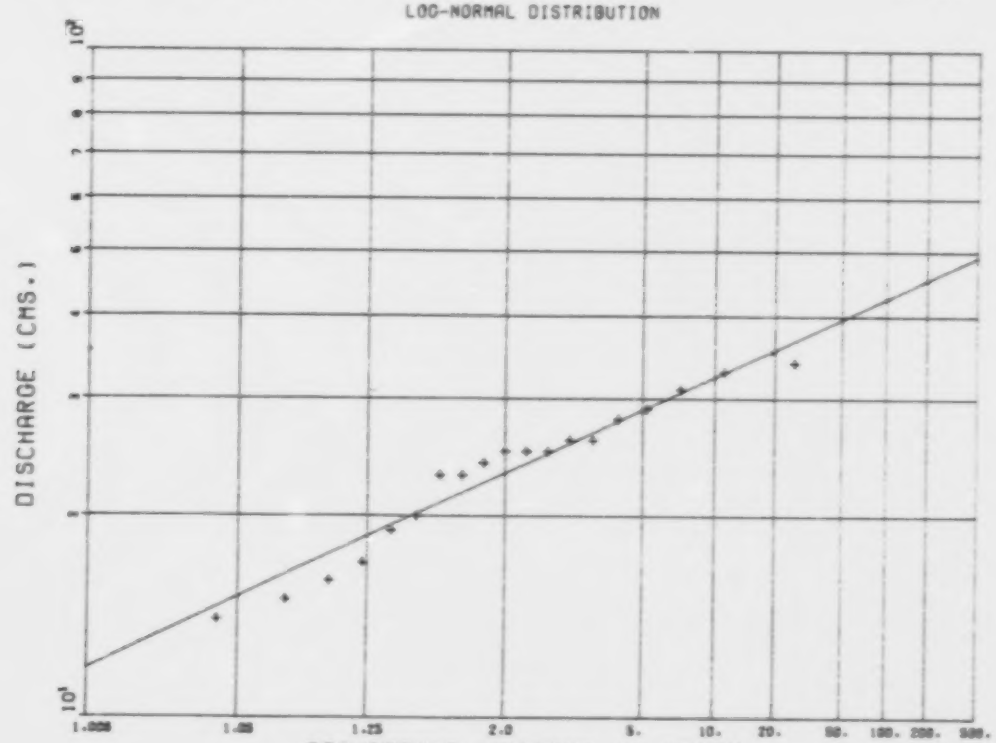
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0663 B = .1548E+02 LOG(M) = 4.1670
ME= .6452E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1431 B = .3506E+01
LOG(M)F= 3.6422 M = .3818E+02
DISTRIBUTION STATISTICS MEAN = 3.1406 S.D. = .2679 C.S. =-1.0681

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	12.		12.		0.		9.		10.	
1.050	15.		15.		0.		14.		15.	
1.250	18.		19.		0.		19.		19.	
2.000	23.		23.		0.		24.		24.	
2.330	24.	6.47	24.	6.03	0.	0.00	25.	5.64	25.	6.43
5.000	29.	7.63	29.	6.97	0.	0.00	29.	4.86	29.	5.32
10.000	33.	8.59	32.	8.09	0.	0.00	31.	4.45	32.	6.45
20.000	37.	9.42	36.	9.18	0.	0.00	33.	4.31	34.	7.77
50.000	42.	10.30	40.	10.60	0.	0.00	34.	4.38	37.	10.43
100.000	46.	10.90	42.	11.50	0.	0.00	35.	4.65	39.	12.70
200.000	49.	11.40	45.	12.40	0.	0.00	36.	5.06	40.	15.13
500.000	54.	11.90	49.	13.60	0.	0.00	36.	5.71	42.	18.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

BRONTE CREEK NEAR ZIMMERMAN 02HB011

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I55.0

BURNT RIVER NEAR BURNT RIVER 02HF003

DRAINAGE AREA : 1270.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1966 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	115.	34.	-.184	6.200
LN X SERIES	4.68	.38	-2.051	11.314

X(MIN)= 32. CMS. TOTAL SAMPLE SIZE= 17
X(MAX)= 191. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

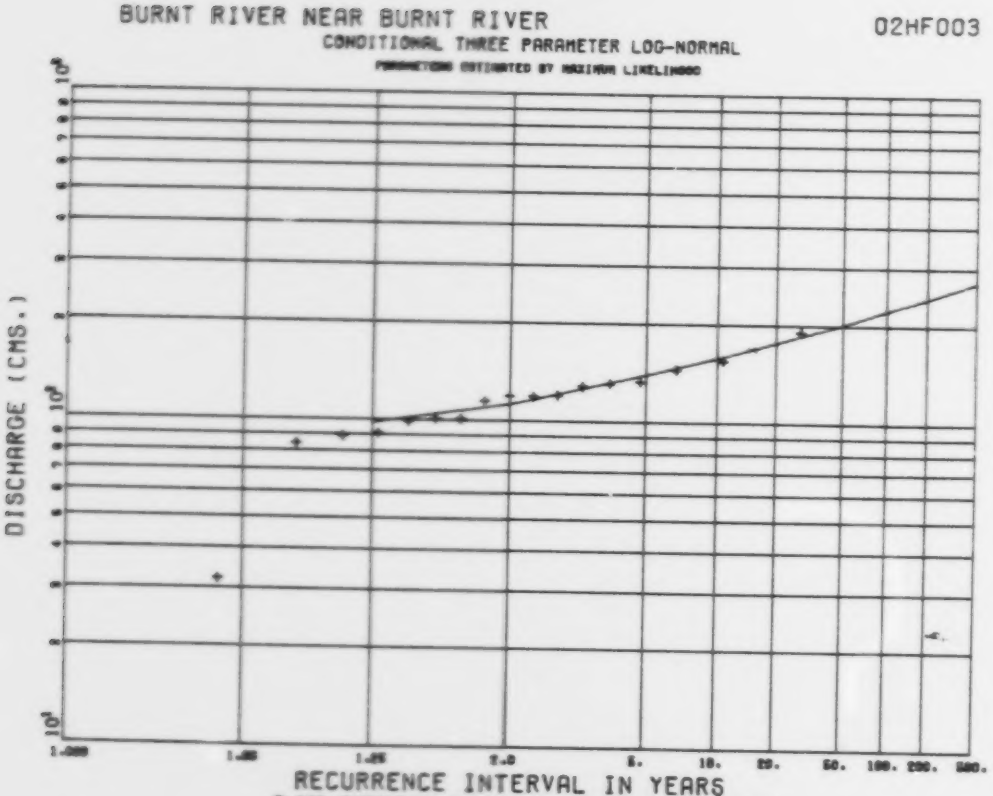
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	120.	28.	1.082	5.771
LN X SERIES	4.76	.22	.466	4.221
LN (X-A) SERIES	3.93	.49	-.129	3.644

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 63.4368 M = 3.9255 S = .4938

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	98.
2.000	.500	112.
2.330	.429	117.
5.000	.200	139.
10.000	.100	157.
20.000	.050	176.
50.000	.020	201.
100.000	.010	222.
200.000	.005	242.
500.000	.002	271.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 156.0

CANAGAGIGUE CREEK NEAR ELMIRA 02GA023

DRAINAGE AREA : 118.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1958 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	36.	16.	.804	5.116
LN X SERIES	3.49	.47	-.667	4.392

X(MIN)= 18. CMS. TOTAL SAMPLE SIZE= 25
X(MAX)= 88. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	37.	15.	.469	5.356
LN X SERIES	3.54	.41	-.321	4.047
LN (X-A) SERIES	3.62	.31	-.017	3.913

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -10.7006 M = 3.8225 S = .3069

FLOOD FREQUENCY REGIME

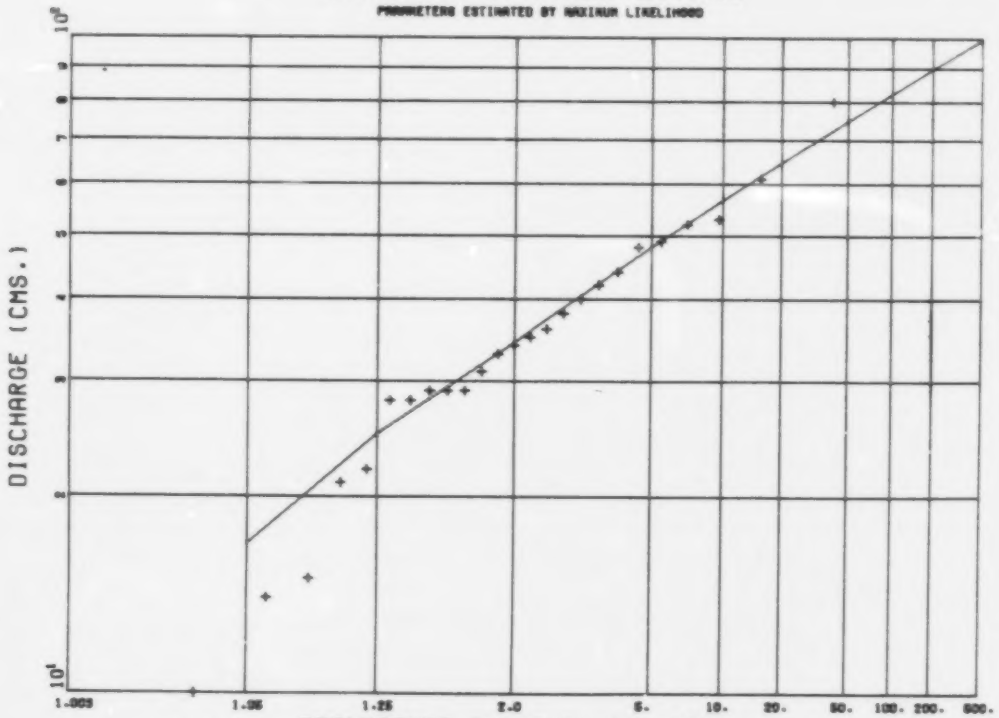
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	17.
1.250	.800	25.
2.000	.500	34.
2.330	.429	37.
5.000	.200	48.
10.000	.100	57.
20.000	.050	66.
50.000	.020	75.
100.000	.010	82.
200.000	.005	90.
500.000	.002	100.

CANAGAGIGUE CREEK NEAR ELMIRA 02GA023

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I57.0

CANAGAGIGUE CREEK NEAR FLORADALE 02GA036

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 17.9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1983

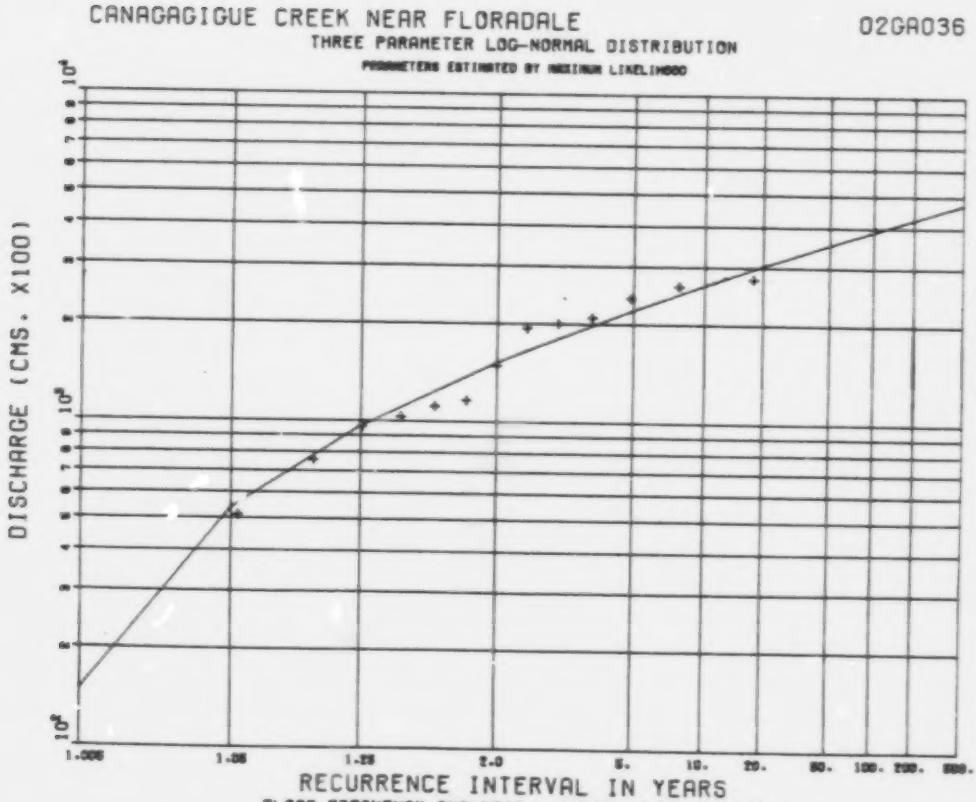
SAMPLE STATISTICS
MEAN = 1602. S.D. = 742.2 C.S. = .1844 C.K. = 2.5689
SAMPLE STATISTICS (LOGS)
MEAN = 7.2643 S.D. = .5207 C.S. = -.4428 C.K. = 3.2871
SAMPLE MIN = 512. SAMPLE MAX = 2760. N = 13

PARAMETERS FOR GUMBEL I A = .881634 U = 1253.
PARAMETERS FOR LOGNORMAL M = 7.2643 S = .5207
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1199. M = 7.9843 S = .2789
STATISTICS OF LOG(X-A)
MEAN = 7.9843 S.D. = .2789 C.S. = -.1229 C.K. = 2.6783
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1257 B = .17166+02 LOG(M) = 9.4218
ME= .1238E+05

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	232.		374.		149.		0.		295.	
1.050	572.		607.		836.		0.		568.	
1.250	962.		921.		957.		0.		937.	
2.000	1480.		1438.		1518.		0.		1490.	
2.330	1610.	13.40	1574.	14.60	1640.	13.90	0.	0.00	1630.	15.50
5.000	2170.	14.10	2210.	16.80	2200.	13.20	0.	0.00	2230.	14.60
10.000	2638.	14.90	2780.	19.50	2638.	15.10	0.	0.00	2690.	15.80
20.000	3070.	15.60	3360.	22.20	3030.	17.60	0.	0.00	3110.	18.20
50.000	3640.	16.40	4160.	25.60	3530.	21.40	0.	0.00	3710.	22.20
100.000	4070.	16.90	4880.	27.80	3890.	24.40	0.	0.00	4330.	25.20
200.000	4490.	17.30	5460.	30.00	4240.	27.40	0.	0.00	5000.	30.70
500.000	5060.	17.70	6400.	32.80	4710.	31.30	0.	0.00	4760.	44.60

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 150.0

CARP RIVER NEAR KINBURN 02KF011

DRAINAGE AREA : 259.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1983

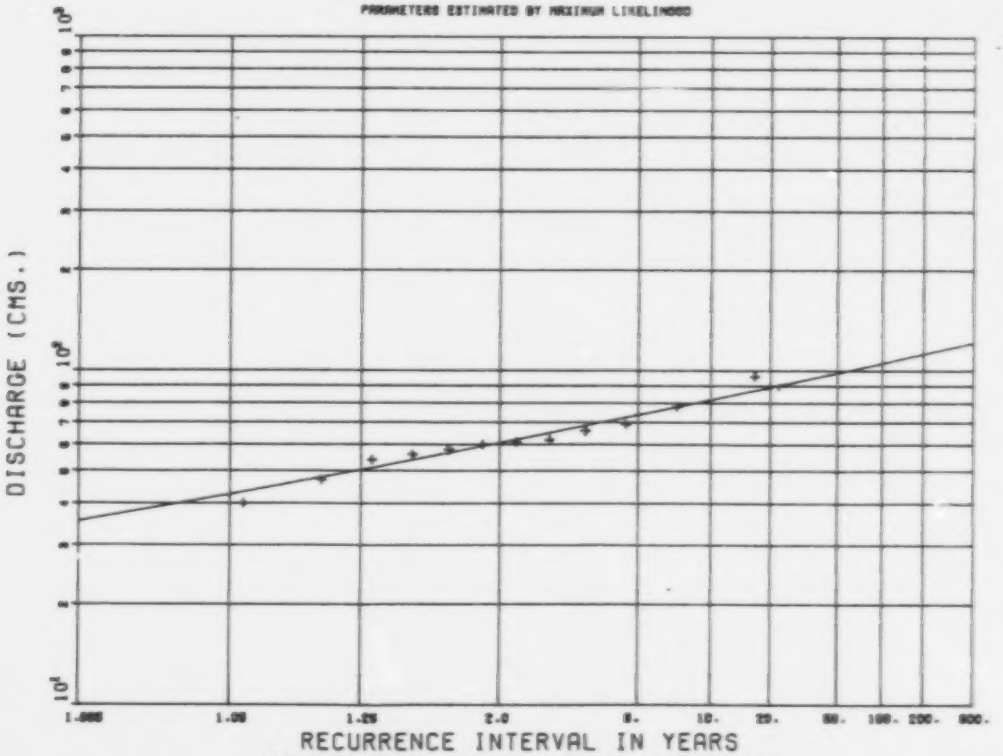
SAMPLE STATISTICS
MEAN = 62. S.D. = 14.5 C.S. = .9793 C.K. = 5.9757
SAMPLE STATISTICS (LOGS)
MEAN = 4.1076 S.D. = .2254 C.S. = .1959 C.K. = 5.0743
SAMPLE MIN = 40. SAMPLE MAX = 96. N = 12

PARAMETERS FOR GUMBEL I A = .087444 U = 56.
PARAMETERS FOR LOGNORMAL M = 4.1076 S = .2254
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. M = 3.9031 S = .2760
STATISTICS OF LOG(X-A)
MEAN = 3.9031 S.D. = .2760 C.S. = .0164 C.K. = 5.0540
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0221 B = .1042E+03 LOG(M) = 1.8067
ME= .6890E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0164 B = .1740E+03
LOG(M)F= 1.2623 M = .3534E+01
DISTRIBUTION STATISTICS MEAN = 4.1076 S.D. = .2157 C.S. = .1516

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	37.		34.		35.		36.		36.	
1.050	43.		42.		42.		43.		43.	
1.250	50.		50.		50.		51.		50.	
2.000	60.		61.		61.		61.		60.	
2.330	63.	6.70	63.	6.56	63.	7.05	63.	6.77	63.	7.12
5.000	73.	5.15	74.	7.57	73.	7.90	73.	7.57	73.	8.00
10.000	82.	9.35	81.	8.78	81.	9.56	80.	9.14	81.	9.74
20.000	90.	10.47	88.	9.98	89.	11.70	88.	11.40	89.	12.20
50.000	100.	11.60	97.	11.50	98.	15.10	96.	15.00	99.	16.20
100.000	108.	12.30	103.	12.50	105.	17.70	103.	18.00	106.	19.60
200.000	116.	13.00	109.	13.50	112.	20.40	109.	21.20	113.	23.10
500.000	127.	13.70	116.	14.80	121.	24.00	118.	25.60	123.	28.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CARP RIVER NEAR KINBURN 02KF011
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 159.0

CARRICK CREEK NEAR CARLSRUHE 02FC011

DRAINAGE AREA = 163.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1954 - 1982

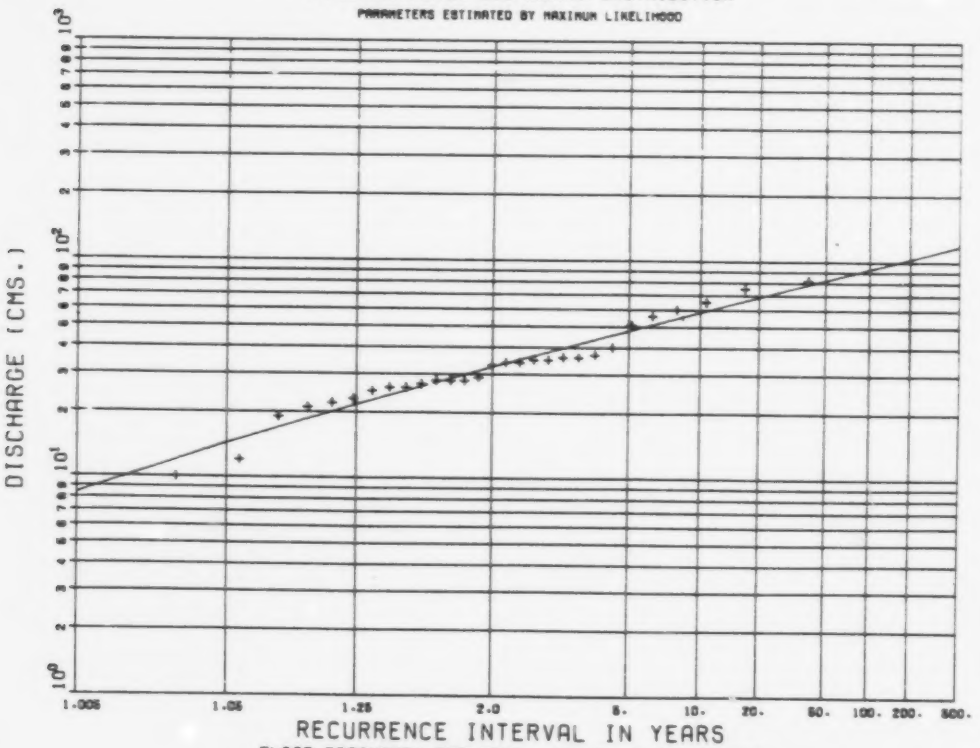
SAMPLE STATISTICS
MEAN = 36. S.D. = 17.4 C.S. = 1.2624 C.K. = 4.4973
SAMPLE STATISTICS (LOGS)
MEAN = 3.4646 S.D. = .4786 C.S. = -.1735 C.K. = 4.0207
SAMPLE MIN = 19. SAMPLE MAX = 82. N = 29

PARAMETERS FOR GUMBEL I A = .079898 U = 28.
PARAMETERS FOR LOGNORMAL P = 3.4646 S = .4786
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -4. M = 3.5904 S = .4208
STATISTICS OF LOG(X-A)
MEAN = 3.5904 S.D. = .4208 C.S. = .0350 C.K. = 3.7999
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0415 B = .1329E+03 LOG(P) = 8.9819
ME= .1795E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0325 B = .2090E+03
LOG(M)F=10.2622 M = .2863E+05
DISTRIBUTION STATISTICS MEAN = 3.4646 S.D. = .4702 C.S. = -.1383

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	7.		9.		8.		9.		9.	
1.050	14.		15.		14.		15.		14.	
1.250	22.		21.		22.		22.		22.	
2.000	32.		32.		32.		32.		32.	
5.000	47.	8.34	48.	8.96	48.	9.22	48.	9.38	48.	9.57
10.000	56.	9.55	59.	12.00	58.	11.60	58.	11.30	59.	11.30
20.000	65.	10.10	70.	13.60	69.	13.80	68.	13.60	69.	13.60
50.000	77.	10.60	85.	15.70	82.	17.00	81.	17.50	82.	17.60
100.000	86.	11.00	97.	17.10	93.	19.50	91.	20.90	92.	21.10
200.000	94.	11.30	110.	18.50	103.	22.00	101.	24.60	101.	24.90
500.000	106.	11.60	127.	20.20	118.	25.20	114.	29.60	115.	30.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

CARRICK CREEK NEAR CARLSRUHE 02FC011
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I60.0

CASTOR RIVER AT RUSSELL 02LB006

DRAINAGE AREA : 433.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1948 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	154.	59.	.590	3.665
LN X SERIES	4.96	.41	-.684	4.732

X(MIN)= 48. CMS. TOTAL SAMPLE SIZE= 35
X(MAX)= 304. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

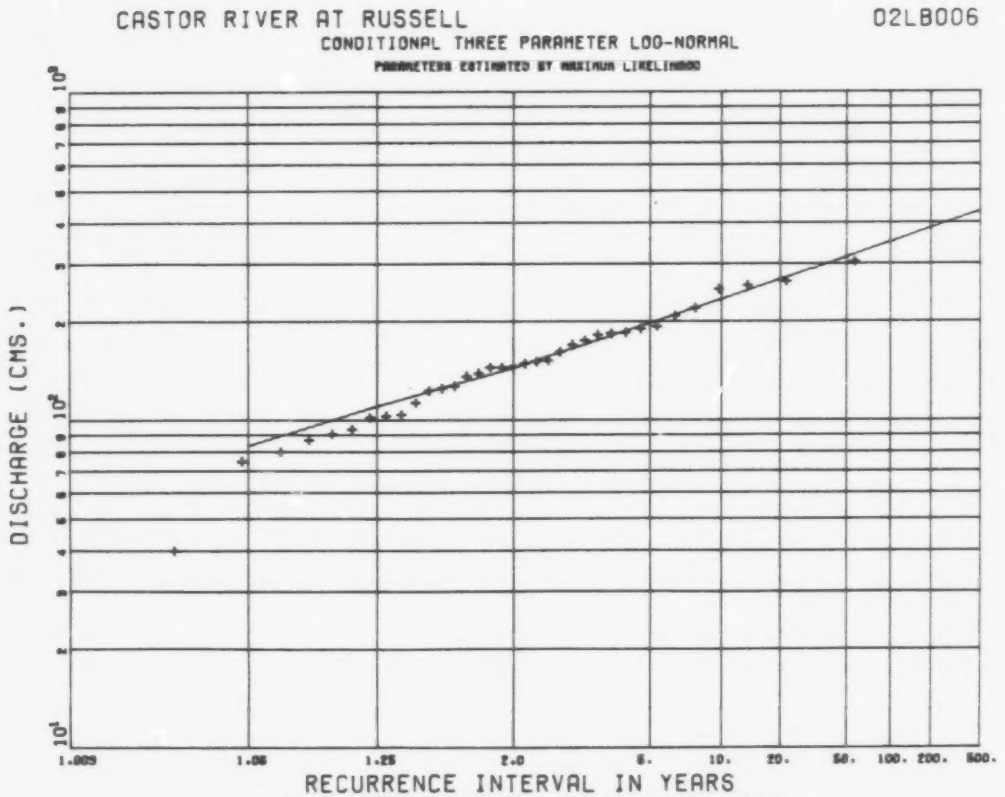
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	157.	56.	.771	3.683
LN X SERIES	4.99	.36	.010	2.836
LN (X-A) SERIES	4.86	.41	-.096	2.846

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 17.8583 M = 4.8552 S = .4083

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	83.
1.250	.800	110.
2.000	.500	144.
2.330	.429	154.
5.000	.200	197.
10.000	.100	233.
20.000	.050	268.
50.000	.020	313.
100.000	.010	348.
200.000	.005	384.
500.000	.002	432.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 161.0

CAT RIVER BELOW WESLEYAN LAKE 04GA002

DRAINAGE AREA : 5390.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1983

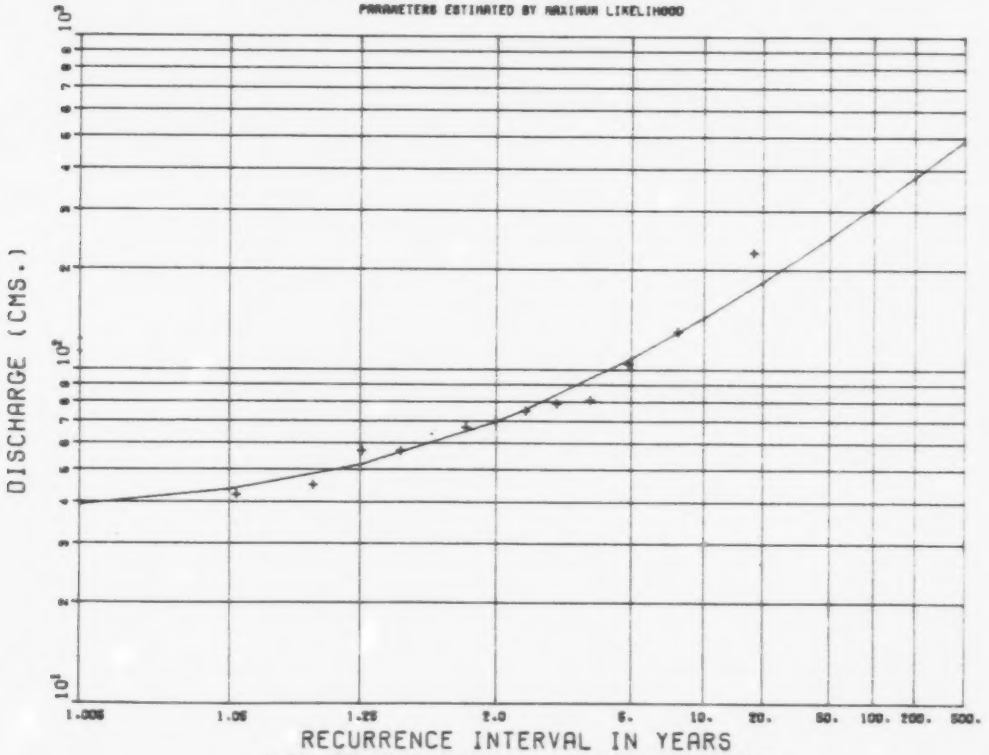
SAMPLE STATISTICS
MEAN = 84. S.D. = 48.4 C.S. = 2.3360 C.K. = 10.1139
SAMPLE STATISTICS (LOGS)
MEAN = 4.3271 S.D. = .4485 C.S. = 1.1822 C.K. = 5.8257
SAMPLE MIN = 42. SAMPLE MAX = 225. N = 13

PARAMETERS FOR GUMBEL I A = .038820 U = 67.
PARAMETERS FOR LOGNORMAL M = 4.3271 S = .4485
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 36. M = 3.5133 S = .9033
STATISTICS OF LOG(X-A)
MEAN = 3.5133 S.D. = .9033 C.S. = -.0915 C.K. = 4.4960
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2651 B = .2862E+01 LOG(M) = 3.5682
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3545E+02
A = .2976 B = .2298E+01
LOG(M)= 3.6433 M = .3822E+02
DISTRIBUTION STATISTICS MEAN = 4.3271 S.D. = .4511 C.S. = 1.3194

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	24.		24.		39.		40.		38.	
1.050	38.		36.		44.		44.		43.	
1.250	54.		52.		52.		52.		52.	
2.000	76.		76.		69.		69.		70.	
2.330	81.	11.10	82.	12.50	75.	13.50	74.	0.00	75.	15.70
5.000	105.	12.20	110.	14.50	106.	19.50	104.	0.00	105.	19.10
10.000	125.	13.30	135.	16.80	143.	25.90	138.	0.00	138.	25.70
20.000	143.	14.10	158.	19.10	184.	32.70	188.	0.00	178.	36.60
50.000	167.	15.06	190.	21.90	250.	41.50	253.	0.00	245.	55.40
100.000	185.	15.60	215.	23.90	310.	47.80	325.	0.00	311.	71.70
200.000	203.	16.10	240.	25.80	380.	53.80	418.	0.00	392.	89.40
500.000	227.	16.60	276.	28.20	488.	61.40	582.	0.00	533.	115.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CAT RIVER BELOW WESLEYAN LAKE 04GA002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I62.0

CATFISH CREEK NEAR SPARTA 02GC019

DRAINAGE AREA = 287.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1965 - 1982

SAMPLE STATISTICS
MEAN = 117. S.D. = 28.9 C.S. = -.6492 C.K. = 2.7234
SAMPLE STATISTICS (LOGS)
MEAN = 4.7306 S.D. = .2799 C.S. = -.9346 C.K. = 3.6403
SAMPLE MIN = 59. SAMPLE MAX = 151. N = 18

PARAMETERS FOR GUMBEL I A = .0314492 U = 103.
PARAMETERS FOR LOGNORMAL M = 4.7306 S = .2799

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1392 B = .4044E+01 LOG(M) = 5.2934
ME= .1990E+03

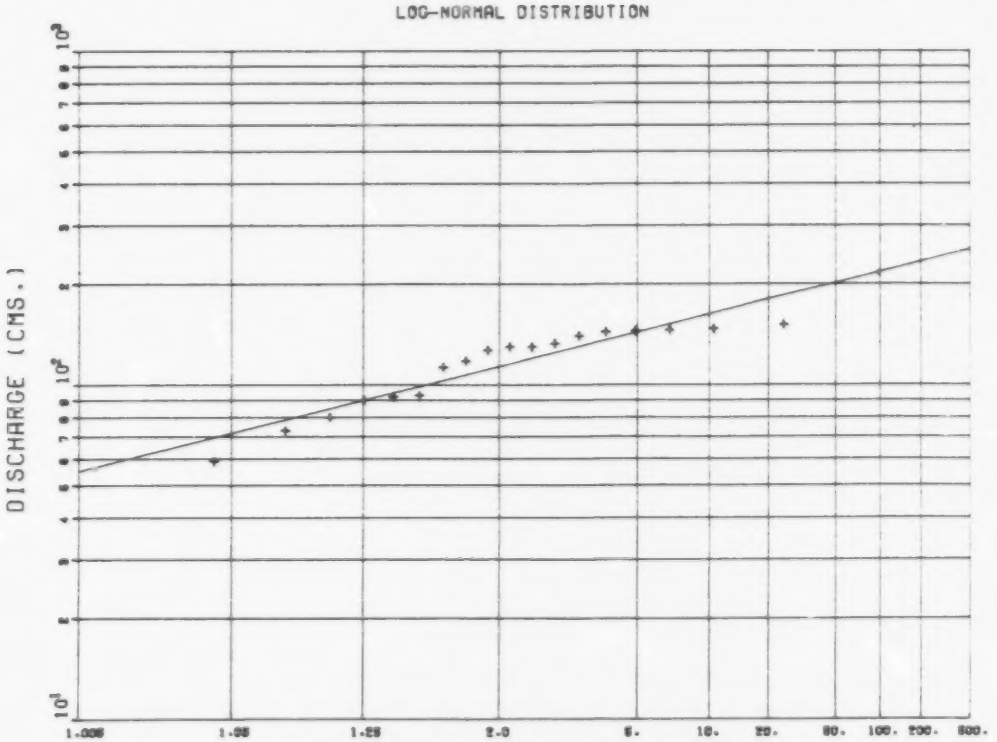
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	54.		55.		0.		0.		43.	
1.050	70.		72.		0.		0.		67.	
1.250	89.		90.		0.		0.		92.	
2.000	113.		113.		0.		0.		115.	
2.330	119.	7.27	119.	6.55	0.	0.00	0.	0.00	124.	7.24
5.000	146.	8.43	145.	7.64	0.	0.00	0.	0.00	144.	5.49
10.000	168.	9.42	162.	8.90	0.	0.00	0.	0.00	155.	5.93
25.000	189.	10.21	180.	10.19	0.	0.00	0.	0.00	164.	6.27
50.000	216.	11.10	201.	11.60	0.	0.00	0.	0.00	173.	12.30
100.000	236.	11.73	217.	12.70	0.	0.00	0.	0.00	178.	15.50
200.000	256.	12.40	234.	13.70	0.	0.00	0.	0.00	182.	18.60
500.000	283.	12.70	254.	15.00	0.	0.00	0.	0.00	186.	22.60

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT

CATFISH CREEK NEAR SPARTA 02GC018

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I63.0

CEDAR CREEK AT WOODSTOCK 02GD011

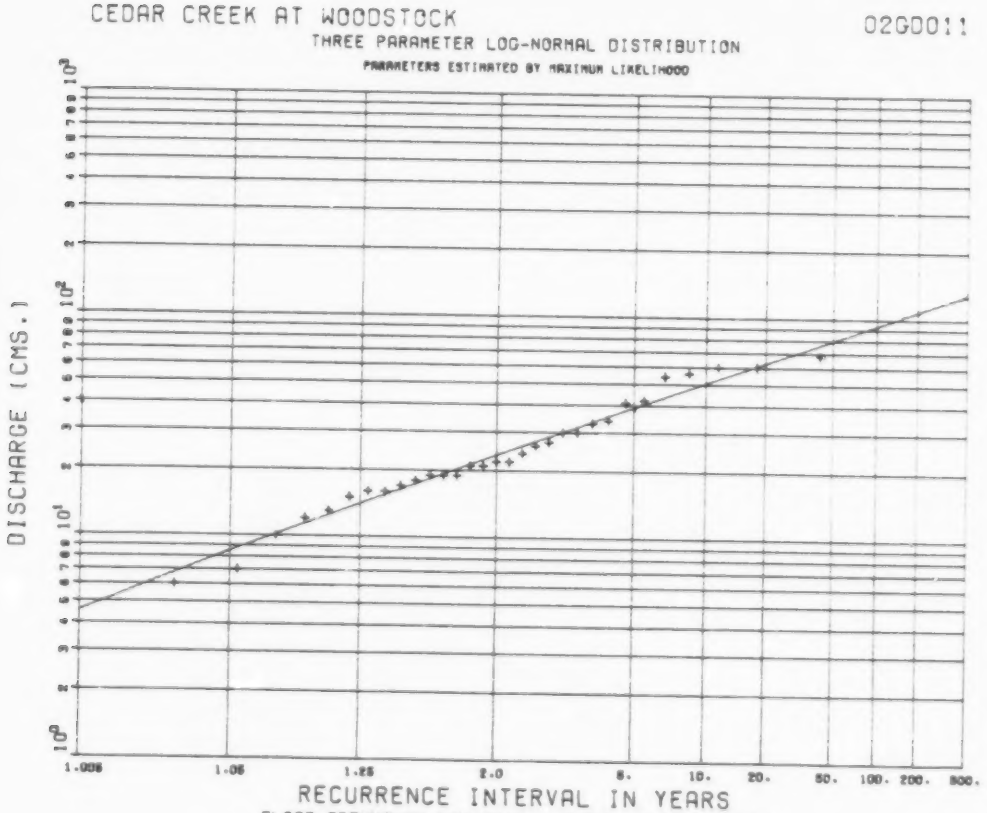
DRAINAGE AREA : 93.2 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1952 - 1982

SAMPLE STATISTICS
MEAN = 28. S.D. = 16.7 C.S. = 1.0524 C.K. = 3.5142
SAMPLE STATISTICS (LOGS)
MEAN = 3.1485 S.D. = .6078 C.S. = -.1419 C.K. = 3.1340
SAMPLE MIN = 6. SAMPLE MAX = 68. N = 31

PARAMETERS FOR GUMBEL I A = .235544 U = 20.
PARAMETERS FOR LOGNORMAL M = 3.1485 S = .6078
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 3.1961 S = .5793
STATISTICS OF LOG(X-A)
MEAN = 3.1961 S.D. = .5793 C.S. = -.0661 C.K. = 3.2956
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0431 B = .1990E+03 LOG(M) =11.7236
ME= .1235E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1581 B = .1061E+03
LOG(M)= 9.3135 M = .1109E+05
DISTRIBUTION STATISTICS MEAN = 3.1485 S.D. = .5986 C.S. = -.1342

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		5.		5.		4.		4.	
1.050	7.		9.		8.		8.		8.	
1.250	15.		14.		14.		14.		14.	
2.000	25.		23.		24.		24.		24.	
2.330	27.	9.81	25.	11.00	25.	11.70	26.	11.50	26.	11.80
5.000	38.	9.97	33.	12.70	34.	13.40	34.	11.90	35.	12.30
10.000	47.	10.40	41.	14.70	42.	14.70	42.	13.50	42.	14.10
20.000	55.	10.80	49.	16.70	50.	17.50	50.	16.10	50.	17.00
50.000	66.	11.20	61.	19.30	62.	21.40	62.	20.70	63.	22.10
100.000	74.	11.40	70.	21.00	71.	24.30	71.	24.70	72.	25.40
200.000	82.	11.70	79.	22.70	80.	27.10	80.	29.00	81.	31.10
500.000	93.	11.90	91.	24.90	92.	30.80	92.	34.90	93.	37.50

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I64.0

CEDAR RIVER BELOW WABASKANG LAKE 05QE008

DRAINAGE AREA = 1690.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1970 - 1982

SAMPLE STATISTICS
MEAN = 25. S.D. = 17.3 C.S. = 1.8059 C.K. = 7.4368
SAMPLE STATISTICS (LOGS)
MEAN = 3.0418 S.D. = .6095 C.S. = .3610 C.K. = 4.2834
SAMPLE MIN = 7. SAMPLE MAX = 71. N = 13

PARAMETERS FOR GUMBEL I A = .096616 U = 18.
PARAMETERS FOR LOGNORMAL M = 3.0418 S = .6095
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 2.8438 S = .7350
STATISTICS OF LOG(X-A)
MEAN = 2.8438 S.D. = .7350 C.S. = -.0132 C.K. = 4.4862
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1100 B = .3070E+02 LOG(M) = -.3349
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .7154E+00
A = .1071 B = .2998E+02
LOG(M)F= -.1677 M = .8456E+00
DISTRIBUTION STATISTICS MEAN = 3.0418 S.D. = .5862 C.S. = .3653

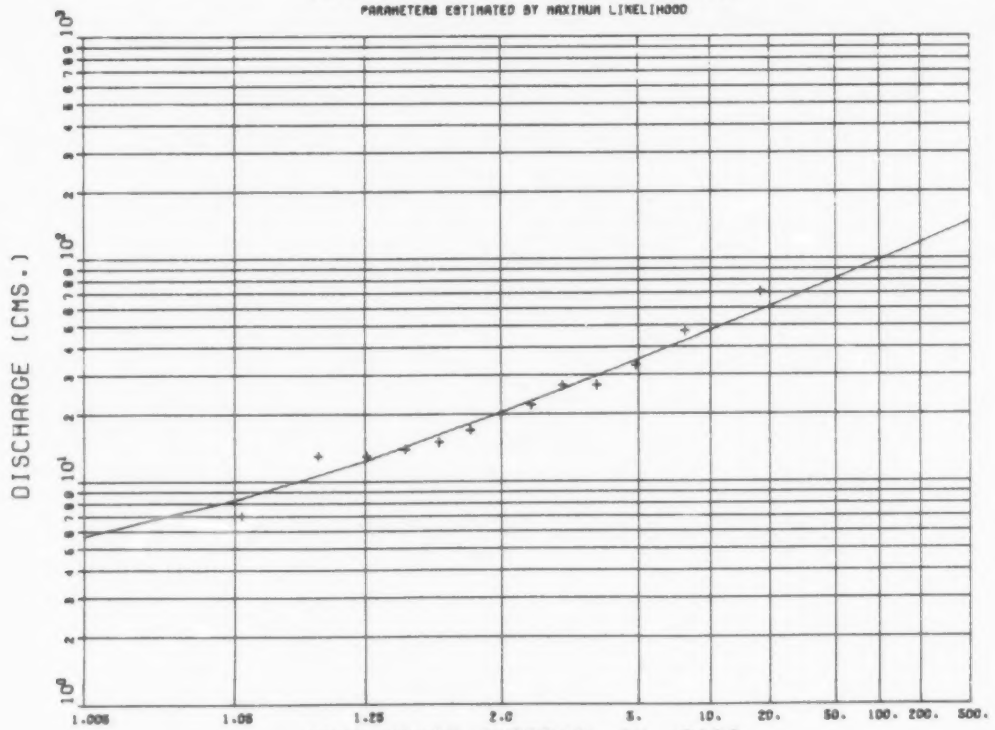
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		4.		6.		6.		5.	
1.050	7.		8.		8.		9.		8.	
1.250	13.		13.		12.		13.		12.	
2.000	22.		21.		20.		20.		20.	
2.330	24.	15.00	23.	17.00	23.	18.40	22.	17.70	23.	18.70
5.000	34.	15.30	35.	19.70	35.	21.60	34.	20.80	35.	21.60
10.000	42.	16.00	46.	22.80	47.	26.40	45.	25.90	47.	27.00
20.000	49.	16.60	57.	25.90	61.	31.70	58.	32.80	61.	34.70
50.000	59.	17.20	73.	29.80	81.	38.90	78.	43.40	82.	46.90
100.000	66.	17.60	86.	32.50	98.	44.10	96.	52.30	101.	57.10
200.000	73.	18.00	101.	35.10	117.	49.10	116.	61.60	124.	67.90
500.000	83.	18.30	121.	38.30	146.	55.50	148.	74.50	159.	83.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

CEDAR RIVER BELOW WABASKANG LAKE 05QE008

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 165.0

CHUKUNI RIVER NEAR EAR FALLS 05QC001

DRAINAGE AREA : 4920.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1963 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	97.	33.	1.645	10.142
LN X SERIES	4.52	.33	-.388	5.880
X(MIN)= 38. CMS.		TOTAL SAMPLE SIZE= 20		
X(MAX)= 205. CMS.		NO. OF OUTLIERS= 1		

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	100.	31.	2.231	12.022
LN X SERIES	4.56	.27	.860	7.019
LN (X-A) SERIES	4.13	.41	.139	5.977

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 31.8759 M = 4.1348 S = .4053

FLOOD FREQUENCY REGIME

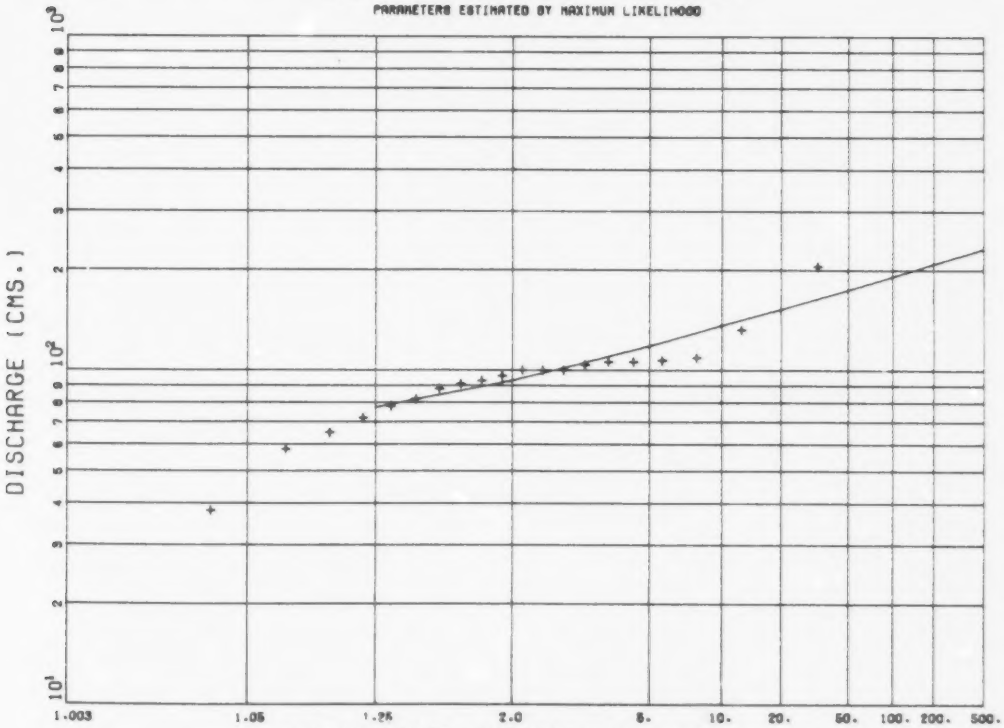
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	77.
2.000	.500	93.
2.330	.429	98.
5.000	.200	118.
10.000	.100	136.
20.000	.050	152.
50.000	.020	174.
100.000	.010	191.
200.000	.005	208.
500.000	.002	231.

CHUKUNI RIVER NEAR EAR FALLS 05QC001

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I64.0

CLYDE RIVER AT GORDON RAPIDS 02KF013

DRAINAGE AREA : 280.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

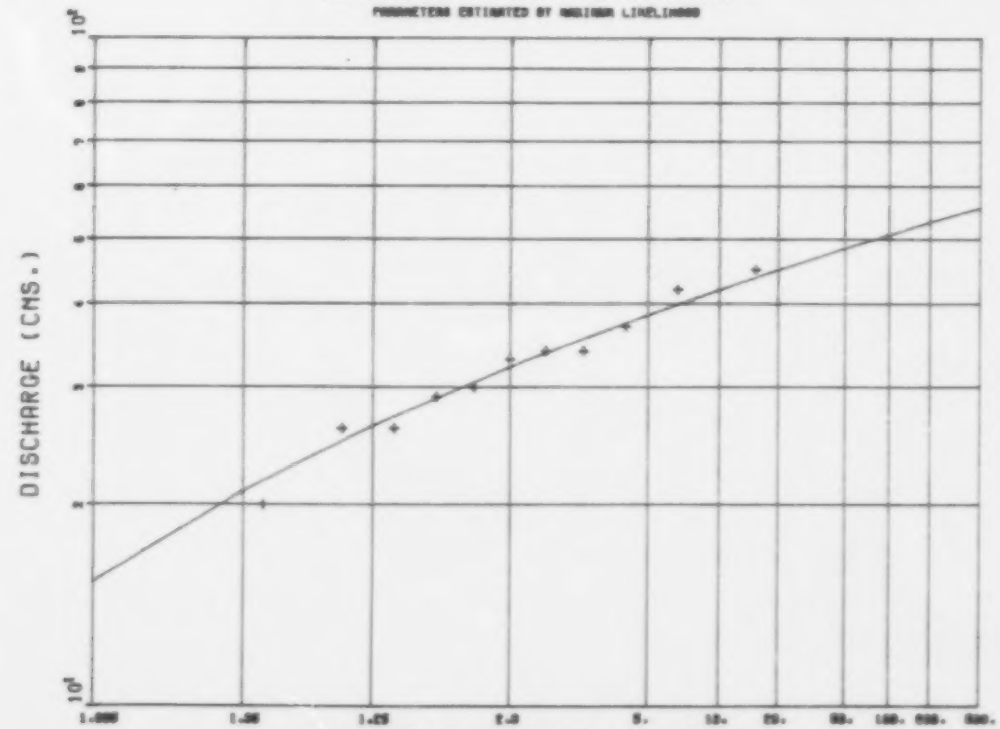
SAMPLE STATISTICS
MEAN = 32. S.D. = 7.3 C.S. = .1786 C.K. = 3.9992
SAMPLE STATISTICS (LOGS)
MEAN = 3.4532 S.D. = .2321 C.S. = -.3846 C.K. = 4.3946
SAMPLE MIN = 20. SAMPLE MAX = 45. N = 11

PARAMETERS FOR GUMBEL I A = .156527 U = 29.
PARAMETERS FOR LOGNORMAL M = 3.4532 S = .2321
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -54. M = 4.4687 S = .0839
STATISTICS OF LOG(X-A)
MEAN = 4.4687 S.D. = .0839 C.S. = -.0177 C.K. = 4.2432
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0446 B = .2705E+02 LOG(M) = 4.6603
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1057E+03
A = -.3637 B = .1236E+02
LOG(M)= 4.2489 M = .6947E+02
DISTRIBUTION STATISTICS MEAN = 3.4532 S.D. = .2241 C.S. = -.5689

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	19.		17.		15.		16.		16.	
1.050	22.		22.		21.		21.		21.	
1.250	26.		26.		26.		26.		26.	
2.000	31.		32.		32.		32.		32.	
5.000	37.	7.49	38.	7.05	38.	7.19	38.	6.91	39.	7.52
10.000	43.	10.30	43.	9.45	42.	8.82	41.	6.90	42.	8.02
20.000	48.	11.40	46.	10.70	45.	9.44	44.	7.09	45.	9.59
50.000	54.	12.60	51.	12.30	48.	11.70	47.	9.35	49.	12.60
100.000	58.	13.30	54.	13.50	51.	13.60	49.	10.20	51.	15.20
200.000	63.	14.00	58.	14.50	53.	15.50	50.	12.60	53.	18.00
500.000	69.	14.80	62.	15.90	56.	18.00	52.	15.00	56.	21.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CLYDE RIVER AT GORDON RAPIDS 02KF013
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE # 167.0

CLYDE RIVER NEAR LANARK 02KF010

DRAINAGE AREA : 614.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1971 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	74.	17.	.687	5.522
LN X SERIES	4.28	.25	-.771	5.698

X(MIN)= 41. CMS. TOTAL SAMPLE SIZE= 12
X(MAX)= 104. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	77.	14.	.863	5.563
LN X SERIES	4.33	.18	.492	5.362
LN (X-A) SERIES	3.69	.34	-.820	5.583

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 34.8346 M = 3.6983 S = .3367

FLOOD FREQUENCY REGIME

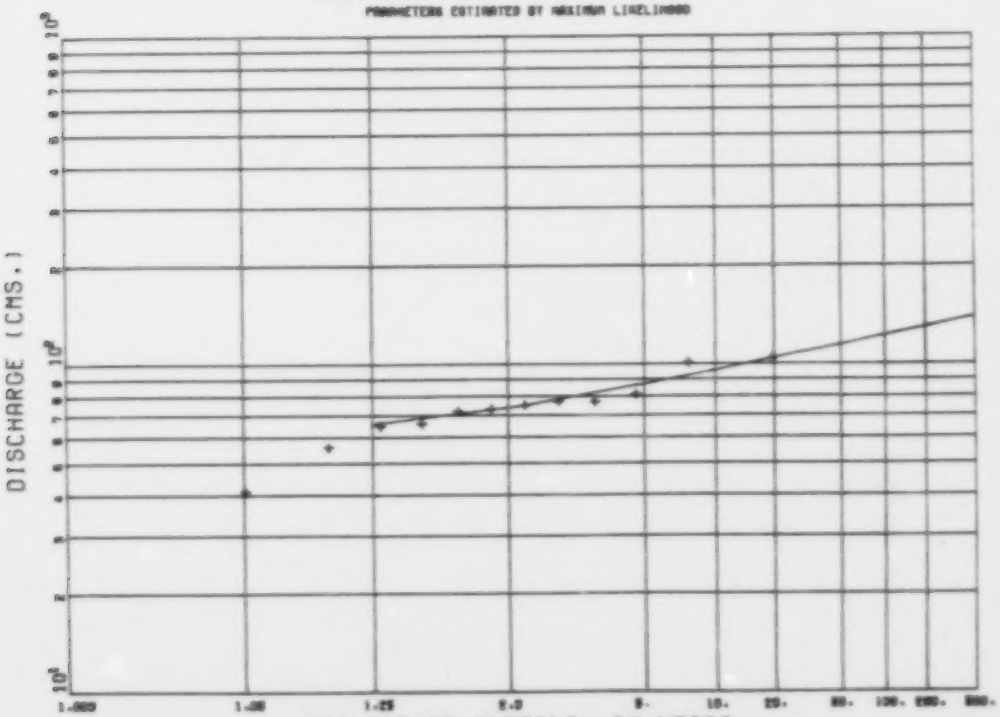
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	96.
2.000	.500	79.
2.330	.429	76.
5.000	.200	87.
10.000	.100	96.
20.000	.050	104.
50.000	.020	114.
100.000	.010	122.
200.000	.005	129.
500.000	.002	139.

CLYDE RIVER NEAR LANARK 02KF010

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 168.0

COLD CREEK NEAR BOLTON 02HC023

DRAINAGE AREA = 62.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1969 - 1981

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	15.	6.	.243	4.620
LN X SERIES	2.64	.47	-.892	5.101

X(MIN)= 5. CMS. TOTAL SAMPLE SIZE= 13
X(MAX)= 26. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

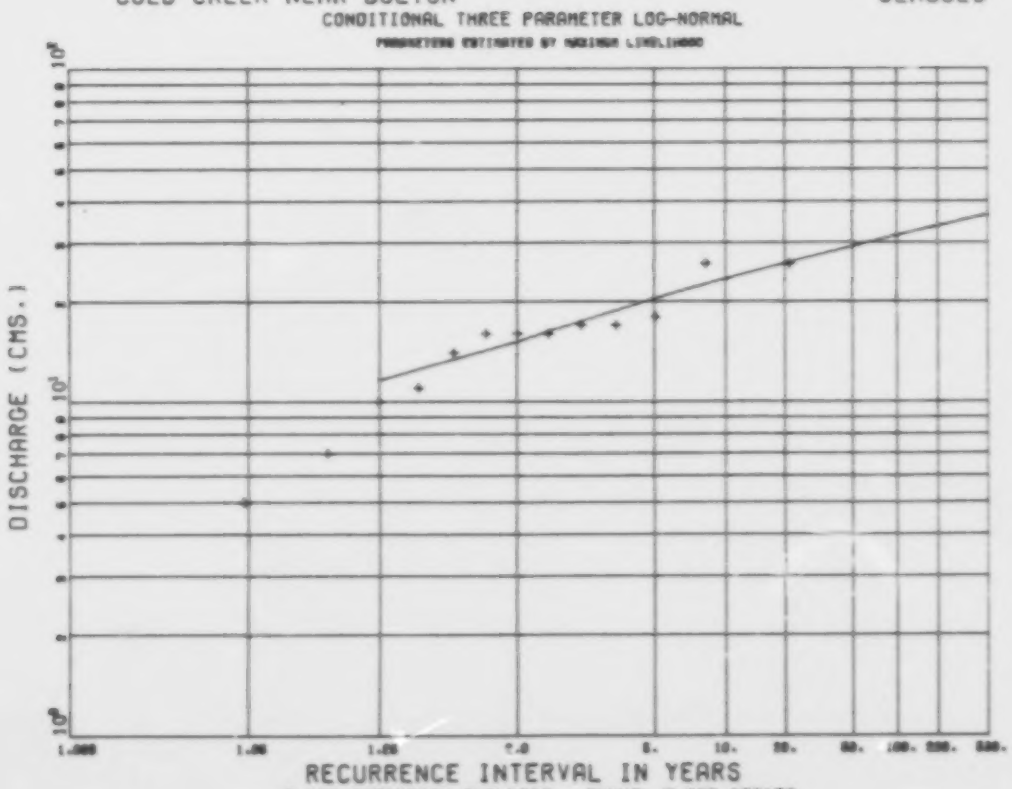
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	16.	6.	.456	5.114
LN X SERIES	2.72	.37	-.568	5.453
LN (X-A) SERIES	3.44	.18	-.021	4.937

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -15.4639 Y = 3.4482 S = .1782

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	12.
2.000	.500	15.
2.330	.429	16.
5.000	.200	20.
10.000	.100	23.
20.000	.050	26.
50.000	.020	29.
100.000	.010	32.
200.000	.005	34.
500.000	.002	36.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE. 1369.0

COLDWATER RIVER AT COLDWATER 02ED007

DRAINAGE AREA : 177.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1982

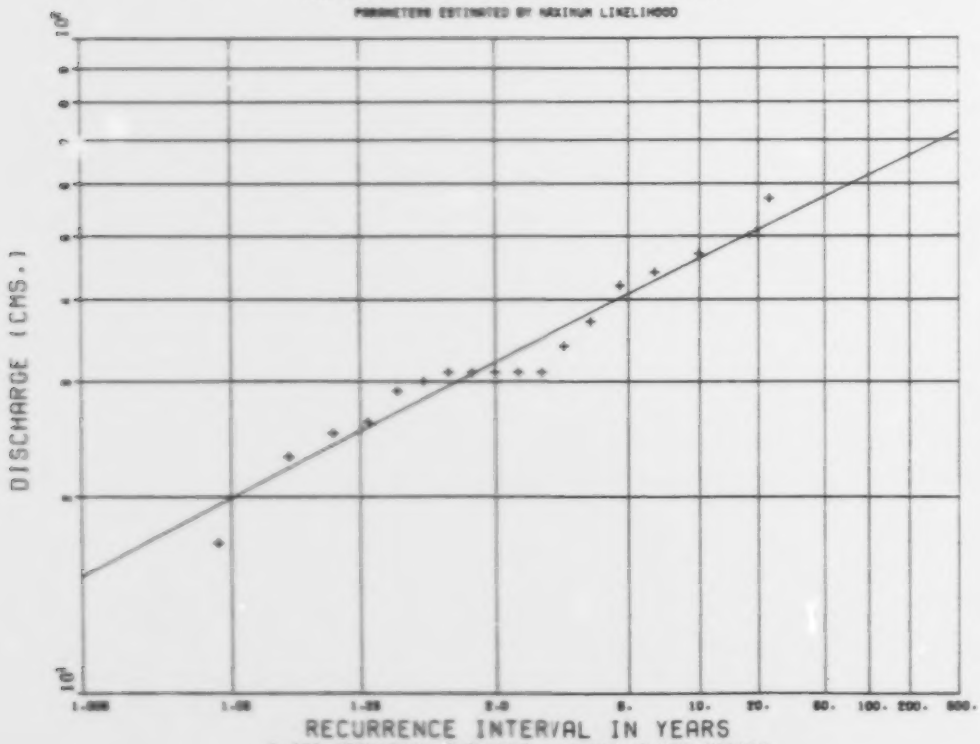
SAMPLE STATISTICS
MEAN = 33. S.D. = 9.7 C.S. = .8774 C.K. = 4.7446
SAMPLE STATISTICS (LOGS)
MEAN = 3.4668 S.D. = .2865 C.S. = -.0428 C.K. = 4.4183
SAMPLE MIN = 17. SAMPLE MAX = 57. N = 17

PARAMETERS FOR GUMBEL I A = .128867 U = 29.
PARAMETERS FOR LOGNORMAL M = 3.4668 S = .2865
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2. M = 3.5299 S = .2689
STATISTICS OF LOG(X-A)
MEAN = 3.5299 S.D. = .2689 C.S. = .0213 C.K. = 4.3663
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0060 B = .2269E+04 LOG(M) =17.1144
ME= .2708E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0046 B = .3649E+04
LOG(M)F=20.2556 M = .6264E+09
DISTRIBUTION STATISTICS MEAN = 3.4668 S.D. = .2779 C.S. = -.0331

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	16.		15.		15.		16.		15.	
1.050	20.		20.		20.		20.		20.	
1.250	25.		25.		25.		25.		25.	
2.000	32.		32.		32.		32.		32.	
2.330	33.	7.14	34.	7.08	34.	7.40	34.	7.29	34.	7.51
5.000	41.	8.35	41.	8.09	41.	7.97	41.	7.82	41.	8.04
10.000	46.	9.37	46.	9.38	46.	9.43	46.	9.13	46.	9.37
20.000	52.	10.20	51.	10.70	51.	11.40	51.	11.10	51.	11.40
50.000	59.	11.20	58.	12.30	57.	14.40	56.	14.50	57.	14.90
100.000	65.	11.80	62.	13.40	62.	16.70	61.	17.40	62.	17.80
200.000	70.	12.30	67.	14.40	66.	19.10	65.	20.40	66.	21.00
500.000	77.	12.90	73.	15.80	72.	22.30	71.	24.70	72.	25.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

COLDWATER RIVER AT COLDWATER 02ED007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I70.0

COLLINS CREEK NEAR KINGSTON 02HM005

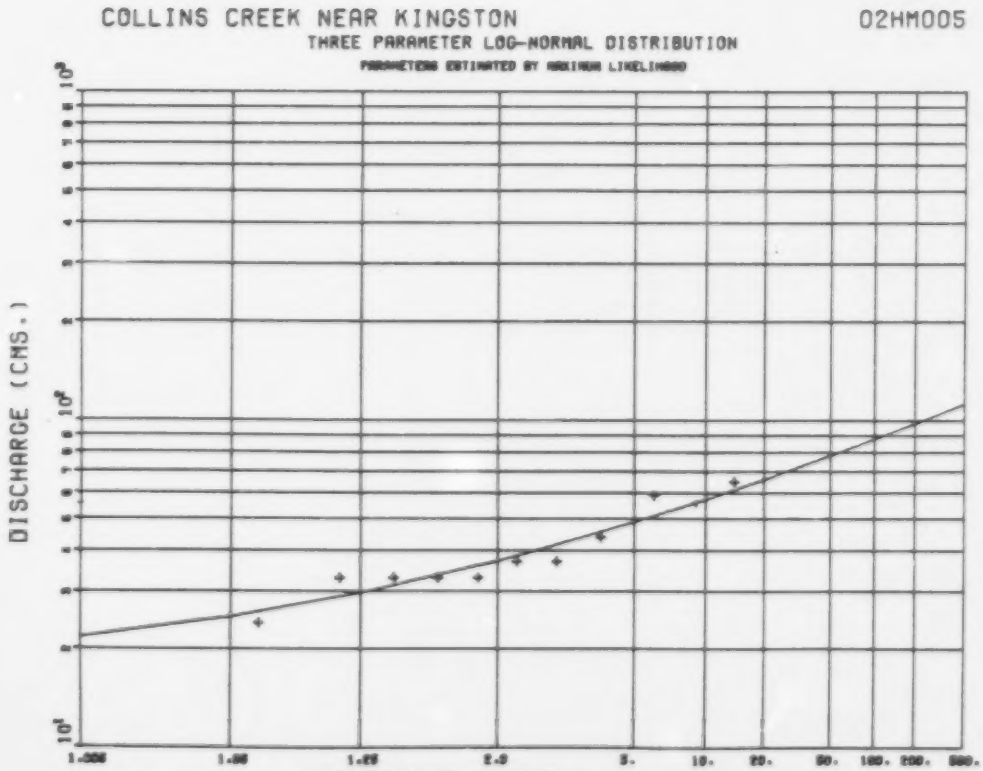
DRAINAGE AREA = 155.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 40. S.D. = 12.8 C.S. = 1.1896 C.K. = 4.9835
SAMPLE STATISTICS (LOGS)
MEAN = 3.6422 S.D. = .2972 C.S. = .6548 C.K. = 4.6061
SAMPLE MIN = 24. SAMPLE MAX = 65. N = 10

PARAMETERS FOR GUMBEL I A = .115976 U = 34.
PARAMETERS FOR LOGNORMAL P = 3.6422 S = .2972
PARAMETERS FOR THREE PARAPETER LOGNORMAL A = 17. M = 3.0204 S = .5338
STATISTICS OF LOG(X-A)
MEAN = 3.0204 S.D. = .5338 C.S. = -.8146 C.K. = 5.0538
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8972 B = .9353E+01 LOG(M) = 2.7332
ME= .1538E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .8959 B = .8701E+01
LOG(M)= 2.8074 M = .1657E+02
DISTRIBUTION STATISTICS MEAN = 3.6422 S.D. = .2838 C.S. = .6788

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	20.		18.		22.		22.		21.	
1.050	25.		23.		25.		26.		25.	
1.250	30.		30.		30.		30.		30.	
2.000	36.		36.		37.		37.		37.	
2.330	39.	8.77	40.	9.47	39.	10.30	39.	9.59	39.	10.80
5.000	47.	10.40	49.	10.90	49.	13.00	48.	12.20	48.	12.80
10.000	54.	11.70	56.	12.70	57.	16.70	56.	15.80	57.	16.70
20.000	60.	12.80	62.	14.40	66.	21.00	64.	20.30	65.	22.30
50.000	68.	14.10	70.	16.60	78.	27.20	75.	27.00	78.	31.30
100.000	74.	14.90	76.	18.10	88.	32.00	85.	32.50	88.	38.90
200.000	80.	15.60	82.	19.50	98.	36.70	95.	38.20	99.	47.00
500.000	88.	16.30	90.	21.30	112.	43.00	109.	46.20	114.	58.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE # 171.0

CONESTOGC RIVER ABOVE DRAYTON 02GAC 39

DRAINAGE AREA = 272.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 221. S.D. = 88.8 C.S. = .5536 C.K. = 3.7373
SAMPLE STATISTICS (LOGS)
MEAN = 5.3340 S.D. = .4030 C.S. = .0470 C.K. = 2.9464
SAMPLE MIN = 125. SAMPLE MAX = 388. N = 10

PARAMETERS FOR GUMBEL I A = .014048 U = 183.
PARAMETERS FOR LOGNORMAL M = 5.3340 S = .4030
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 124. M = 3.6417 S = 2.8171
STATISTICS OF LOG(X-A)
MEAN = 3.6417 S.D. = 2.8171 C.S. = -1.2052 C.K. = 4.8579
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8695 B = .1813E+04 LOG(M) = ********
ME= .7433E-05

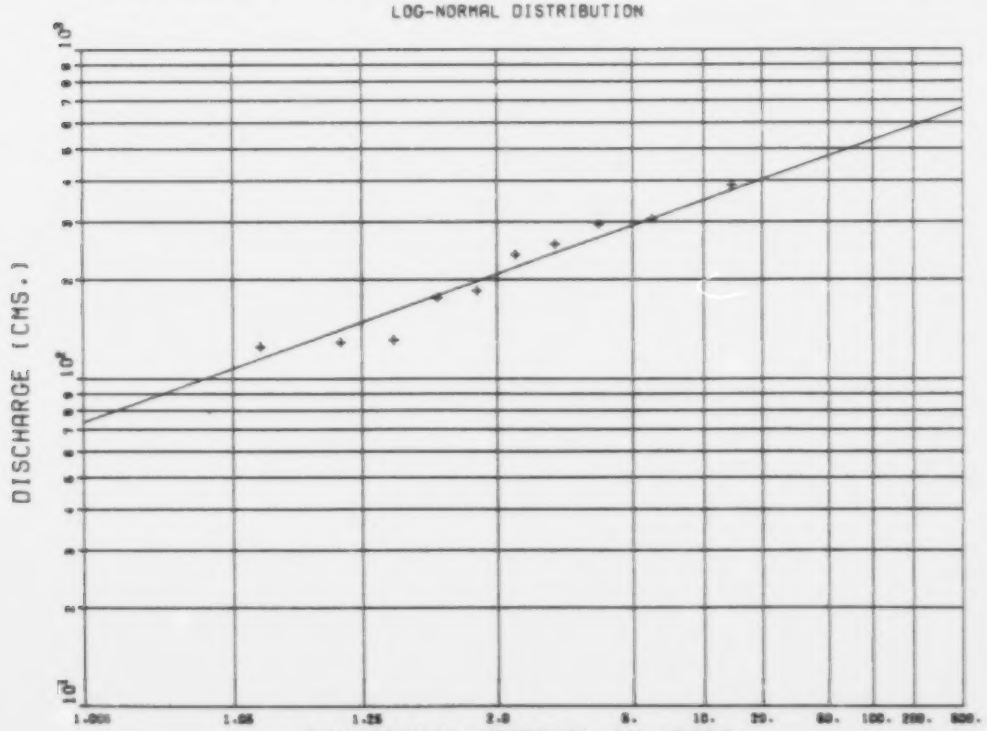
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	71.		73.		125.		0.		75.	
1.050	108.		107.		126.		0.		107.	
1.250	151.		148.		131.		0.		147.	
2.000	200.		207.		163.		0.		207.	
2.330	222.	12.20	223.	12.80	179.	19.60	0.	0.00	222.	13.80
5.000	284.	13.50	291.	14.80	333.	46.50	0.	0.00	291.	15.10
10.000	334.	14.70	347.	17.20	631.	69.30	0.	0.00	348.	17.30
20.000	383.	15.70	402.	19.50	1168.	87.90	0.	0.00	404.	22.00
50.000	446.	16.80	474.	22.50	2530.	108.00	0.	0.00	479.	28.90
100.000	493.	17.50	529.	24.50	4290.	120.00	0.	0.00	537.	34.60
200.000	540.	18.00	585.	26.50	7010.	131.00	0.	0.00	596.	40.60
500.000	601.	18.70	662.	28.90	12800.	144.00	0.	0.00	677.	49.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CONESTOGO RIVER ABOVE DRAYTON 02GA039

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I72.0

CONESTOGO RIVER AT DRAYTON 02GA017

DRAINAGE AREA = 324.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1951 - 1972

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	148.	56.	-.163	3.546
LN X SERIES	4.90	.49	-1.472	6.413

X(MIN)= 33. CMS. TOTAL SAMPLE SIZE= 22
X(MAX)= 260. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

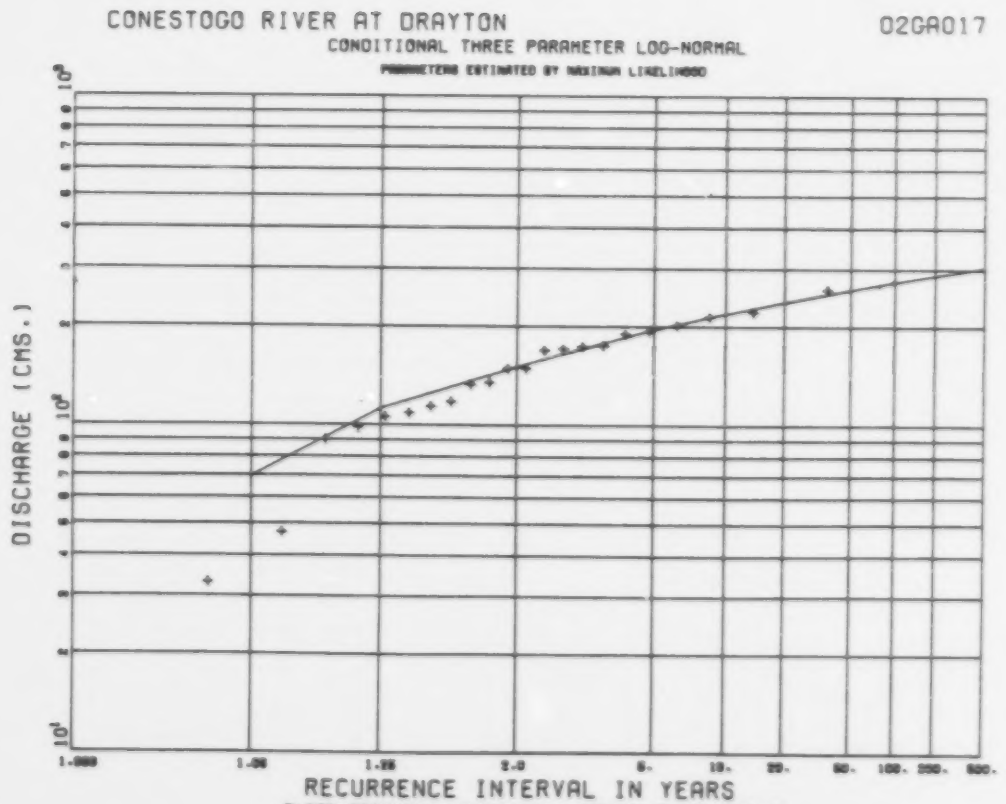
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	153.	51.	.037	3.564
LN X SERIES	4.97	.36	-1.110	5.991
LN (X-A) SERIES	6.18	.82	-.802	3.956

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -3148.4802 M = 8.1821 S = .0156

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	69.
1.250	.800	112.
2.000	.500	140.
5.000	.429	159.
10.000	.200	195.
20.000	.100	218.
50.000	.050	237.
100.000	.020	259.
200.000	.010	274.
500.000	.005	287.
500.000	.002	303.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 173.0

CONESTOGO RIVER AT GLEN ALLAN 02GA028

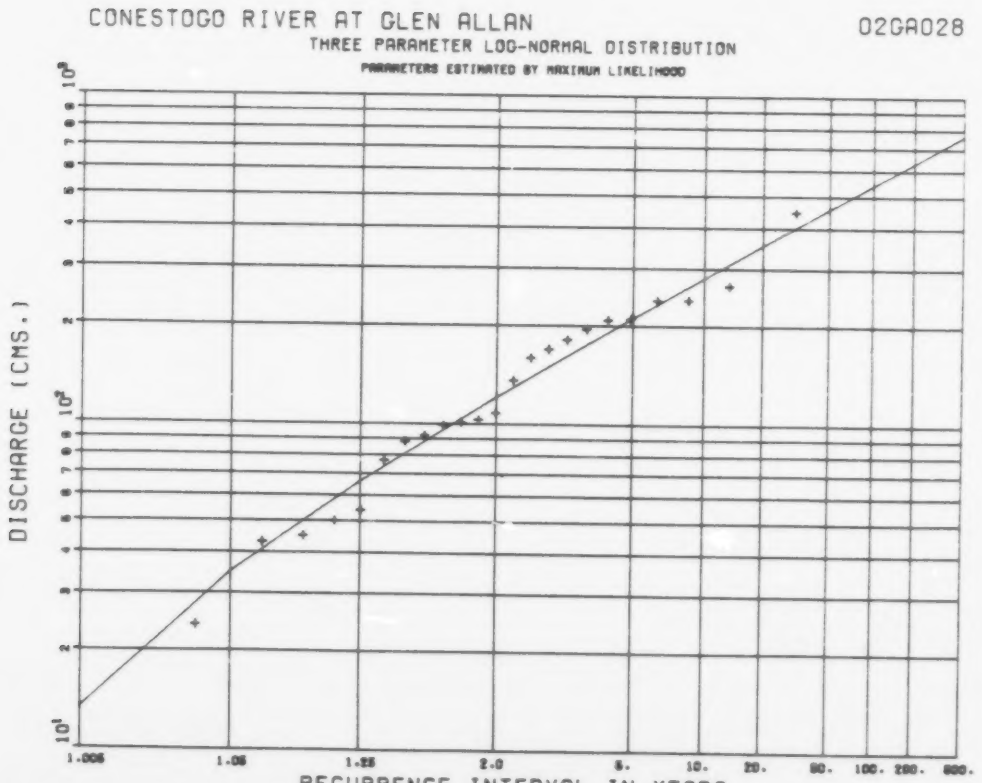
DRAINAGE AREA : 578.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1960 - 1982

SAMPLE STATISTICS
MEAN = 142. S.D. = 96.9 C.S. = 1.3847 C.K. = 6.3331
SAMPLE STATISTICS (LOGS)
MEAN = 4.7577 S.D. = .7073 C.S. = -.3539 C.K. = 3.2421
SAMPLE MIN = 24. SAMPLE MAX = 447. N = 23

PARAMETERS FOR GUMBEL I A = .014655 U = 103.
PARAMETERS FOR LOGNORMAL M = 4.7577 S = .7073
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -15. M = 4.9043 S = .6083
STATISTICS OF LOG(X-A)
MEAN = 4.9043 S.D. = .6083 C.S. = -.1415 C.K. = 3.0420
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1251 B = .3195E+02 LOG(M) = 8.7552
ME= .6344E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1659 B = .1756E+02
LOG(M)= 7.6716 M = .2147E+04
DISTRIBUTION STATISTICS MEAN = 4.7577 S.D. = .6953 C.S. = -.4772

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-16.		19.		13.		14.		15.	
1.050	27.		36.		35.		34.		34.	
1.250	71.		64.		66.		66.		65.	
2.000	128.		116.		120.		123.		121.	
2.330	143.	12.60	132.	14.90	135.	14.80	139.	15.00	137.	15.80
5.000	206.	12.50	211.	17.20	210.	15.20	211.	14.70	213.	15.60
10.000	257.	12.80	288.	19.90	279.	18.60	272.	15.60	286.	17.10
20.000	306.	13.10	373.	22.60	352.	21.90	330.	17.80	346.	20.50
50.000	370.	13.50	498.	26.00	456.	26.50	405.	22.00	434.	26.80
100.000	417.	13.80	604.	28.40	548.	29.50	468.	25.90	502.	32.40
200.000	465.	14.00	720.	30.60	631.	33.30	514.	30.10	571.	38.30
500.000	527.	14.20	893.	33.50	761.	37.60	584.	35.90	663.	46.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I74.0

CONESTOGO RIVER NEAR CONESTOGO 02GA013

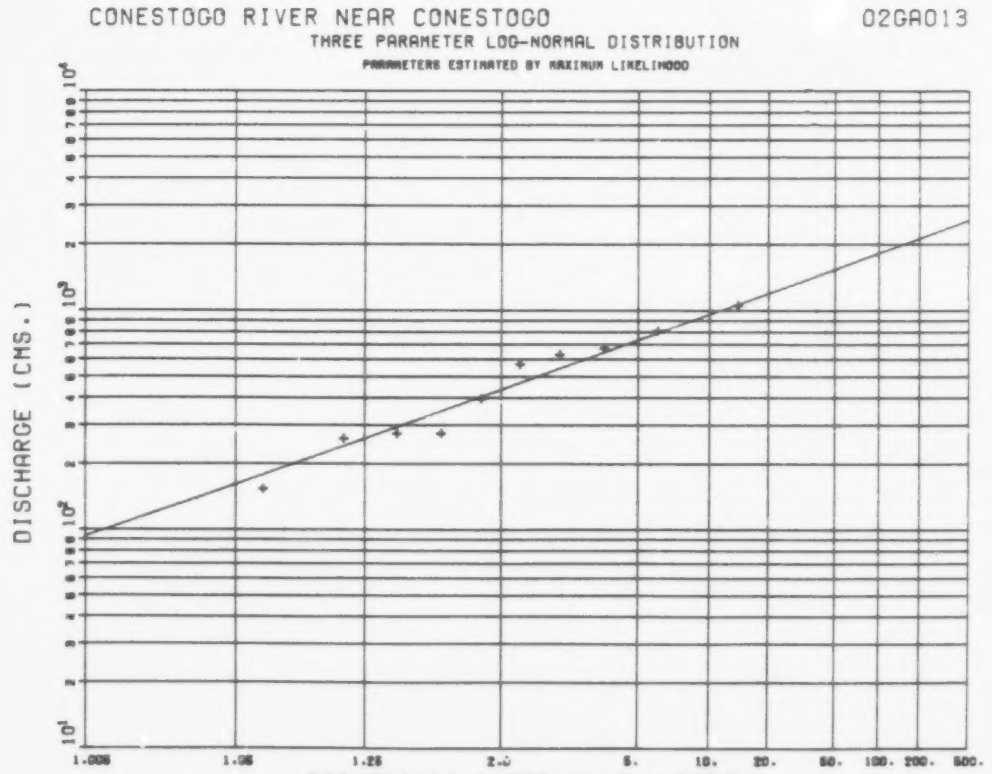
DRAINAGE AREA : 821.8 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1948 - 1957

SAMPLE STATISTICS
MEAN = 509. S.D. = 287.5 C.S. = .6356 C.K. = 3.9759
SAMPLE STATISTICS (LOGS)
MEAN = 6.0763 S.D. = .6188 C.S. = -.2392 C.K. = 3.4385
SAMPLE MIN = 153. SAMPLE MAX = 1056. N = 10

PARAMETERS FOR GUMBEL I A = .004632 U = 381.
PARAMETERS FOR LOGNORMAL M = 6.0763 S = .6188
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 6. M = 6.0592 S = .6205
STATISTICS OF LOG(X-A)
MEAN = 6.0592 S.D. = .6205 C.S. = -.2554 C.K. = 3.4534
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8729 B = .6992E+02 LOG(M) =11.1767
ME= .7145E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2869 B = .4572E+01
LOG(M)F= 7.3881 M = .1617E+04
DISTRIBUTION STATISTICS MEAN = 6.0763 S.D. = .6188 C.S. = -.9354

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	21.		91.		93.		53.		79.	
1.050	141.		168.		160.		139.		153.	
1.250	278.		261.		260.		273.		263.	
2.000	466.		435.		434.		478.		446.	
5.330	606.	17.10	685.	19.40	684.	20.30	679.	18.40	697.	20.70
10.000	705.	17.50	728.	22.40	728.	22.60	734.	16.40	732.	21.10
18.000	867.	18.20	952.	26.80	955.	27.10	876.	15.60	935.	23.70
20.000	1020.	18.90	1190.	29.60	1190.	32.30	992.	15.70	1140.	28.50
50.000	1220.	19.60	1520.	34.00	1540.	39.40	1120.	17.00	1410.	37.00
100.000	1370.	20.10	1800.	37.10	1820.	44.80	1190.	18.80	1620.	44.40
200.000	1520.	20.50	2100.	40.10	2123.	50.00	1260.	21.00	1830.	52.30
500.000	1720.	20.90	2520.	43.80	2560.	56.60	1330.	24.30	2120.	63.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I75.0

CONSECON CREEK AT ALLISONVILLE 02HE002

DRAINAGE AREA : 114.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 31. S.D. = 12.0 C.S. = 1.4863 C.K. = 6.2784
SAMPLE STATISTICS (LOGS)
MEAN = 3.3885 S.D. = .3415 C.S. = .8191 C.K. = 3.9573
SAMPLE MIN = 20. SAMPLE MAX = 62. N = 13

PARAMETERS FOR GUMBEL I A = .130823 U = 26.
PARAMETERS FOR LOGNORMAL M = 3.3885 S = .3415
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 19. M = 1.9161 S = 1.2421
STATISTICS OF LOG(X-A)
MEAN = 1.9161 S.D. = 1.2421 C.S. = -.4720 C.K. = 3.4400
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1299 B = .5962E+01 LOG(M) = 2.5546
ME= .1287E+02

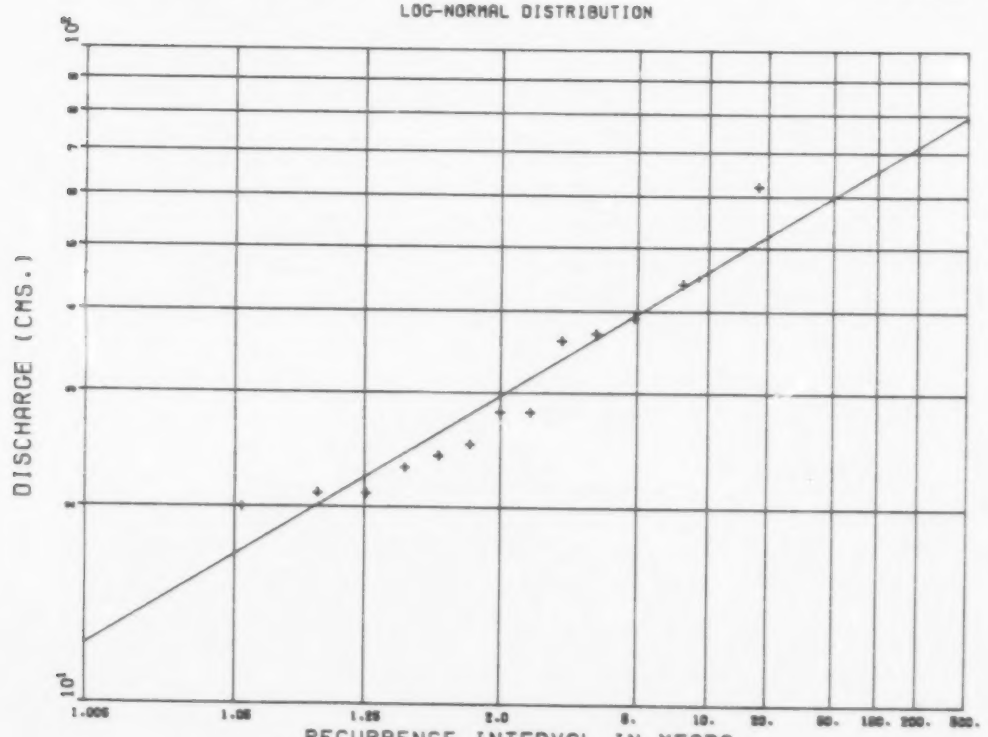
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	14.		12.		20.		0.		16.	
1.05	18.		17.		27.		0.		19.	
1.25	23.		22.		33.		0.		23.	
2.00	29.		28.		39.		0.		28.	
2.33	31.	8.72	32.	9.55	28.	18.70	0.	0.00	30.	11.10
5.00	38.	10.10	40.	11.80	39.	20.10	0.	0.00	39.	13.40
10.00	44.	11.20	46.	12.80	51.	29.30	0.	0.00	47.	17.70
20.00	49.	12.20	52.	14.50	72.	39.80	0.	0.00	56.	24.20
50.00	56.	13.30	60.	16.70	107.	52.20	0.	0.00	69.	34.70
100.00	62.	13.90	66.	18.20	142.	60.70	0.	0.00	81.	43.70
200.00	67.	14.50	71.	19.70	186.	68.60	0.	0.00	93.	53.30
500.00	74.	15.10	79.	21.50	262.	78.20	0.	0.00	112.	66.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

CONSECON CREEK AT ALLISONVILLE 02HE002

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 176.0

CREDIT RIVER AT ERINDALE 02HB002

DRAINAGE AREA : 795.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1946 - 1982

SAMPLE STATISTICS
MEAN = 179. S.D. = 120.4 C.S. = 2.1206 C.K. = 8.3406
SAMPLE STATISTICS (LOGS)
MEAN = 5.0093 S.D. = .5845 C.S. = .1185 C.K. = 4.2996
SAMPLE MIN = 32. SAMPLE MAX = 616. N = 37

PARAMETERS FOR GUMBEL I A = .013978 U = 131.
PARAMETERS FOR LOGNORMAL M = 5.0093 S = .5845
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2. M = 5.0233 S = .5764
STATISTICS OF LOG(X-A)
MEAN = 5.0233 S.D. = .5764 C.S. = .1535 C.K. = 4.2695
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8346 B = .2848E+03 LOG(M) =-4.8550
ME= .7789E-02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0207 B = .7758E+03
LOG(M)F=*.***** M = .1596E-04
DISTRIBUTION STATISTICS MEAN = 5.0093 S.D. = .5764 C.S. = .0718

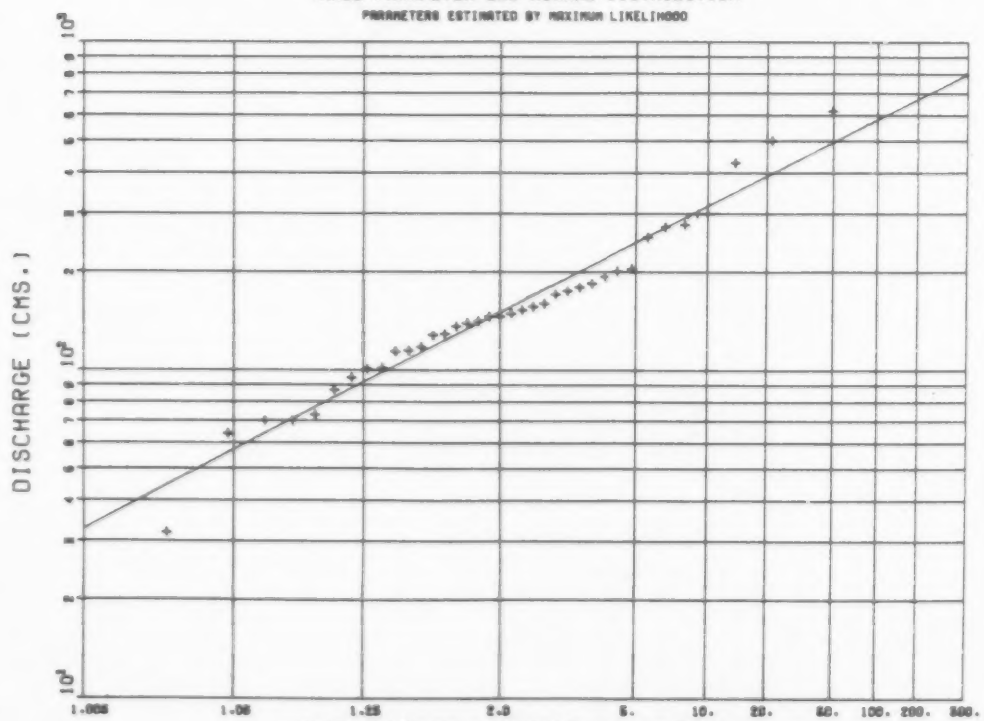
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	12.		33.		33.		35.		36.	
1.050	52.		57.		57.		59.		58.	
1.250	97.		92.		92.		92.		91.	
2.000	158.		150.		150.		149.		148.	
2.330	173.	8.64	166.	9.68	167.	10.10	165.	10.30	164.	10.50
5.000	239.	8.88	245.	11.20	245.	11.10	243.	11.30	244.	11.60
10.000	292.	9.30	317.	13.00	316.	13.20	315.	13.40	319.	13.90
20.000	344.	9.67	392.	14.70	390.	15.80	391.	16.60	399.	17.30
50.000	411.	10.10	498.	16.90	494.	19.10	500.	21.80	516.	22.80
100.000	460.	10.30	583.	18.50	579.	22.00	590.	26.10	614.	27.40
200.000	510.	10.50	675.	20.00	669.	24.60	687.	30.70	721.	32.30
500.000	576.	10.80	806.	21.80	797.	27.90	829.	37.10	878.	39.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CREDIT RIVER AT ERINDALE 02HB002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 177.)

CREDIT RIVER NEAR CATARACT 02HB001

DRAINAGE AREA : 285.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1925 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	25.	12.	1.344	5.433
LN X SERIES	3.08	.52	-.480	4.669
X(MIN)= 4. CMS.		TOTAL SAMPLE SIZE= 58		
X(MAX)= 65. CMS.		NO. OF OUTLIERS= 1		

AFTER REMOVAL OF OUTLIER(S)

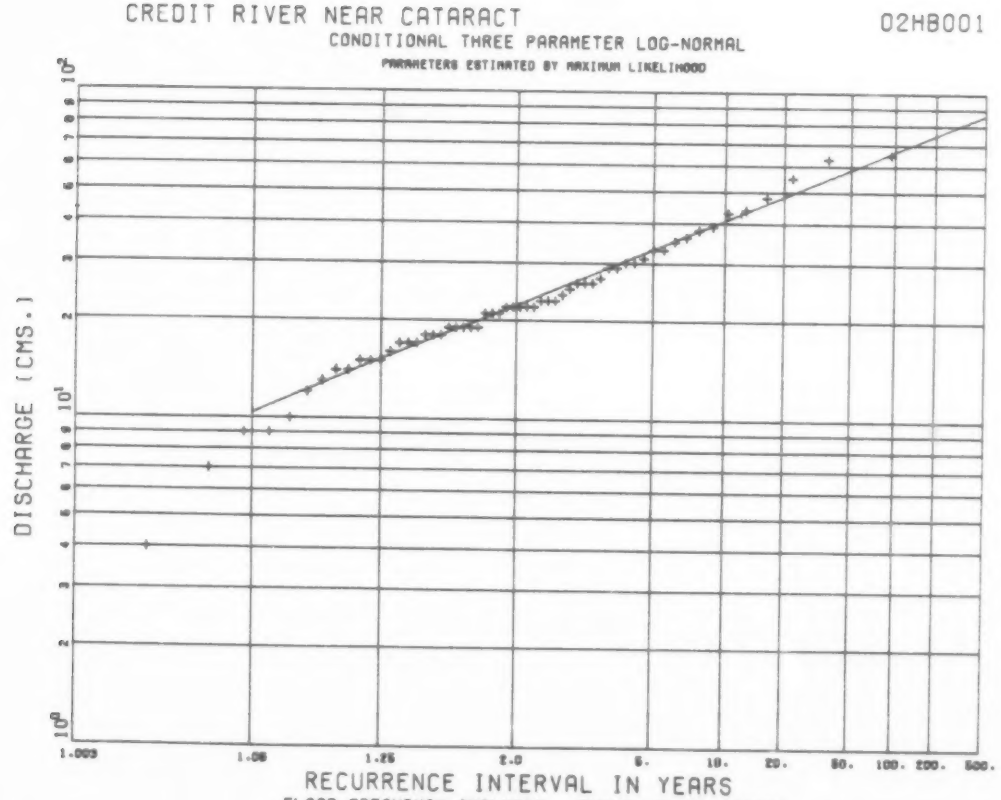
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	25.	12.	1.429	5.557
LN X SERIES	3.11	.47	.029	3.508
LN (X-A) SERIES	3.11	.47	.026	3.510

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = .0443 M = 3.1095 S = .4683

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	10.
1.250	.800	15.
2.000	.500	22.
2.330	.429	24.
5.000	.200	33.
10.000	.100	41.
20.000	.050	48.
50.000	.020	59.
100.000	.010	67.
200.000	.005	75.
500.000	.002	86.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 170.0

CREDIT RIVER NEAR ORANGEVILLE 02HB013

DRAINAGE AREA : 62.2 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1960 - 1982

SAMPLE STATISTICS
MEAN = 7. S.D. = 3.5 C.S. = 2.2793 C.K. = 11.0748
SAMPLE STATISTICS (LOGS)
MEAN = 1.8782 S.D. = .4179 C.S. = .4090 C.K. = 5.6087
SAMPLE MIN = 3. SAMPLE MAX = 18. N = 15

PARAMETERS FOR GUMBEL I A = .455286 U = 6.
PARAMETERS FOR LOGNORMAL M = 1.8782 S = .4179
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 1.6911 S = .5012
STATISTICS OF LOG(X-A)
MEAN = 1.6911 S.D. = .5012 C.S. = .0802 C.K. = 5.2559
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0855 B = .2391E+02 LOG(M) = -.1651

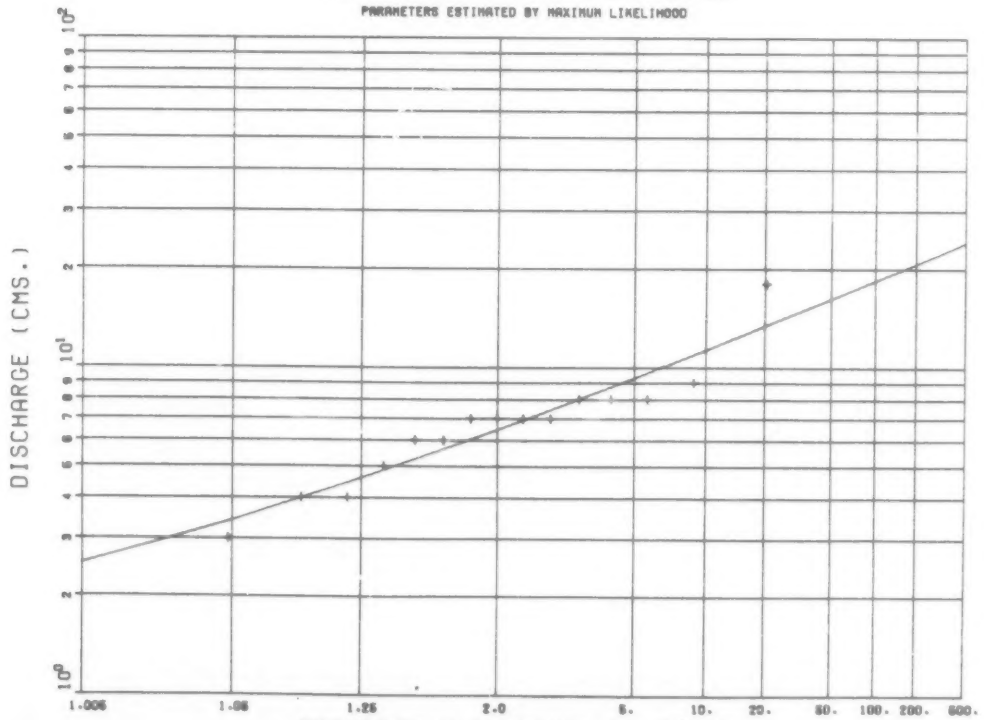
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .8478E+00
A = .0513 B = .6167E+02
LOG(P)F=-1.2856 M = .2765E+00

DISTRIBUTION STATISTICS MEAN = 1.8782 S.D. = .4029 C.S. = .2547

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	2.		2.		3.		3.		3.	
1.050	5.		5.		5.		5.		5.	
1.250	5.		5.		6.		6.		6.	
2.000	7.		7.		8.		8.		8.	
2.330	7.	10.20	7.	10.90	9.	11.70	9.	11.30	9.	12.00
5.000	9.	11.20	9.	12.60	9.	13.40	9.	13.00	9.	14.00
10.000	11.	12.20	11.	14.60	11.	16.40	11.	15.90	11.	17.60
20.000	12.	13.00	11.	16.60	13.	19.90	13.	20.30	14.	22.70
50.000	14.	13.90	15.	19.00	16.	24.80	16.	26.40	17.	30.90
100.000	16.	14.40	17.	20.80	18.	28.80	18.	31.70	20.	37.70
200.000	17.	14.90	19.	22.40	21.	32.80	20.	37.40	23.	45.00
500.000	19.	15.40	22.	24.50	24.	37.50	24.	45.20	27.	55.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CREDIT RIVER NEAR ORANGEVILLE 02HB013
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 179.0

CREDIT RIVER WEST BRANCH AT NORVAL 02HB008

DRAINAGE AREA : 127.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1963 - 1982

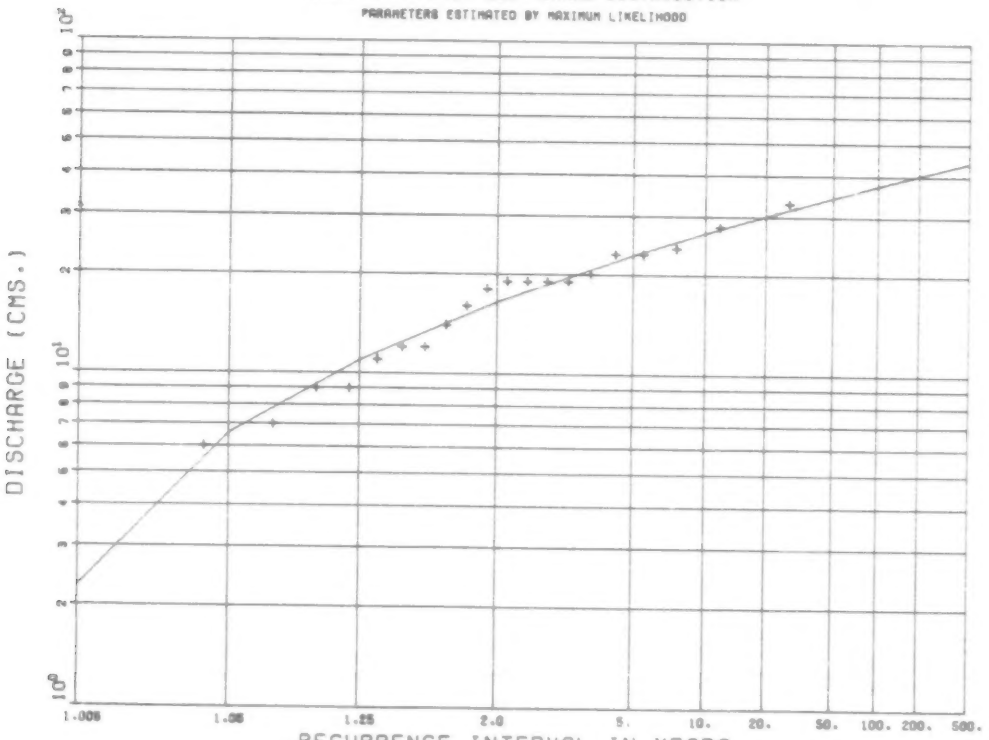
SAMPLE STATISTICS
MEAN = 17. S.D. = 7.1 C.S. = .3641 C.K. = 3.3418
SAMPLE STATISTICS (LOGS)
MEAN = 2.7427 S.D. = .4623 C.S. = -.5192 C.K. = 3.0993
SAMPLE MIN = 6. SAMPLE MAX = 33. N = 20

PARAMETERS FOR GUMBEL I A = .155447 U = 14.
PARAMETERS FOR LOGNORMAL M = 2.7427 S = .4623
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -16. M = 3.5413 S = .2037
STATISTICS OF LOG(X-A)
MEAN = 3.5413 S.D. = .2037 C.S. = -.8573 C.K. = 2.9088
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1200 B = .1484E+02 LOG(M) = 4.5234
NE= .9215E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1948 B = .5590E+01
LOG(M)F= 3.9316 M = .4613E+02
DISTRIBUTION STATISTICS MEAN = 2.7427 S.D. = .4605 C.S. = -.8459

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	4.		5.		2.		3.		4.	
1.050	7.		7.		7.		7.		7.	
1.250	11.		11.		11.		11.		11.	
2.000	16.		16.		16.		17.		16.	
2.330	17.	9.98	17.	10.40	18.	8.93	18.	10.00	18.	11.10
5.000	23.	10.70	23.	12.00	23.	9.53	23.	9.35	23.	10.40
10.000	27.	11.50	28.	14.00	27.	10.60	27.	8.81	27.	11.10
20.000	32.	12.10	33.	15.90	30.	12.30	29.	9.11	31.	13.40
50.000	37.	12.90	40.	18.20	34.	15.00	32.	10.30	35.	17.90
100.000	42.	13.20	46.	19.90	37.	17.10	34.	11.50	38.	21.90
200.000	46.	13.50	51.	21.50	40.	19.20	36.	13.10	41.	26.10
500.000	51.	13.90	59.	23.50	44.	22.00	38.	15.30	44.	31.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

CREDIT RIVER WEST BRANCH AT NORVAL 02HB008
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I80.0

CROWE RIVER AT MARMORA 02HK003

DRAINAGE AREA : 1990.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1963 - 1982

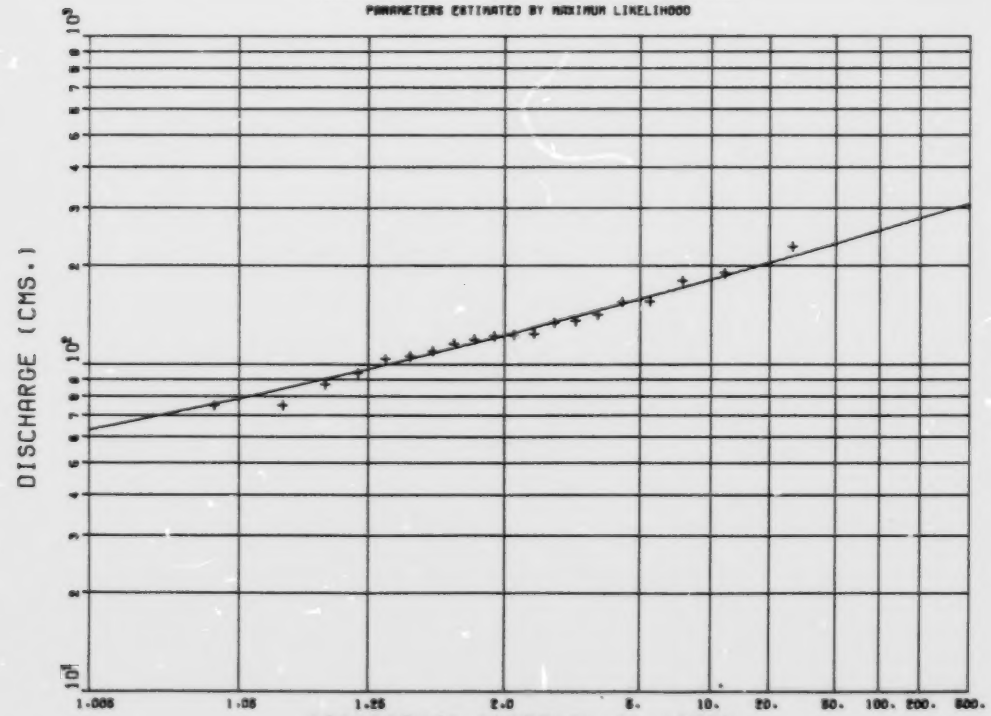
SAMPLE STATISTICS
MEAN = 129. S.D. = 38.9 C.S. = .9391 C.K. = 4.5848
SAMPLE STATISTICS (LOGS)
MEAN = 4.8177 S.D. = .2917 C.S. = .1607 C.K. = 3.5080
SAMPLE MIN = 75. SAMPLE MAX = 229. N = 20

PARAMETERS FOR GUMBEL I A = .033419 U = 112.
PARAMETERS FOR LOGNORMAL M = 4.8177 S = .2917
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 26. M = 4.5665 S = .3737
STATISTICS OF LOG(X-A)
MEAN = 4.5665 S.D. = .3737 C.S. = -.0496 C.K. = 3.4751
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0234 B = .1550E+03 LOG(M) = 1.1861
ME= .3274E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0287 B = .9800E+02
LOG(M)F= 2.0005 M = .7392E+01
DISTRIBUTION STATISTICS MEAN = 4.8177 S.D. = .2846 C.S. = .2020

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	62.		58.		63.		63.		61.	
1.050	78.		77.		78.		79.		78.	
1.250	97.		97.		96.		97.		97.	
2.000	122.		124.		122.		123.		123.	
2.330	129.	6.59	130.	6.57	129.	7.10	129.	6.92	129.	7.12
5.000	156.	7.71	158.	7.59	158.	8.12	157.	7.83	158.	7.95
10.000	179.	8.65	180.	8.80	181.	9.93	179.	9.54	181.	9.62
20.000	200.	9.44	200.	10.00	204.	12.20	201.	11.90	202.	12.00
50.000	224.	10.30	225.	11.50	233.	15.60	229.	15.70	231.	15.90
100.000	249.	10.90	244.	12.60	256.	18.20	250.	18.90	252.	19.10
200.000	270.	11.30	262.	13.60	278.	20.80	272.	22.20	274.	22.60
500.000	297.	11.90	287.	14.80	308.	24.30	301.	26.90	303.	27.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

CROWE RIVER AT MARMORA 02HK003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 181.0

CROWE RIVER NEAR GLEN ALDA 02HK005

DRAINAGE AREA : 456.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1969 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	43.	10.	.501	9.405
LN X SERIES	3.73	.26	-1.311	10.573

X(MIN)= 28. CMS. TOTAL SAMPLE SIZE= 14
X(MAX)= 69. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	45.	8.	2.441	12.995
LN X SERIES	3.78	.16	1.893	10.593
LN (X-A) SERIES	2.28	.60	.085	6.312

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 32.9036 M = 2.2805 S = .6838

FLOOD FREQUENCY REGIME

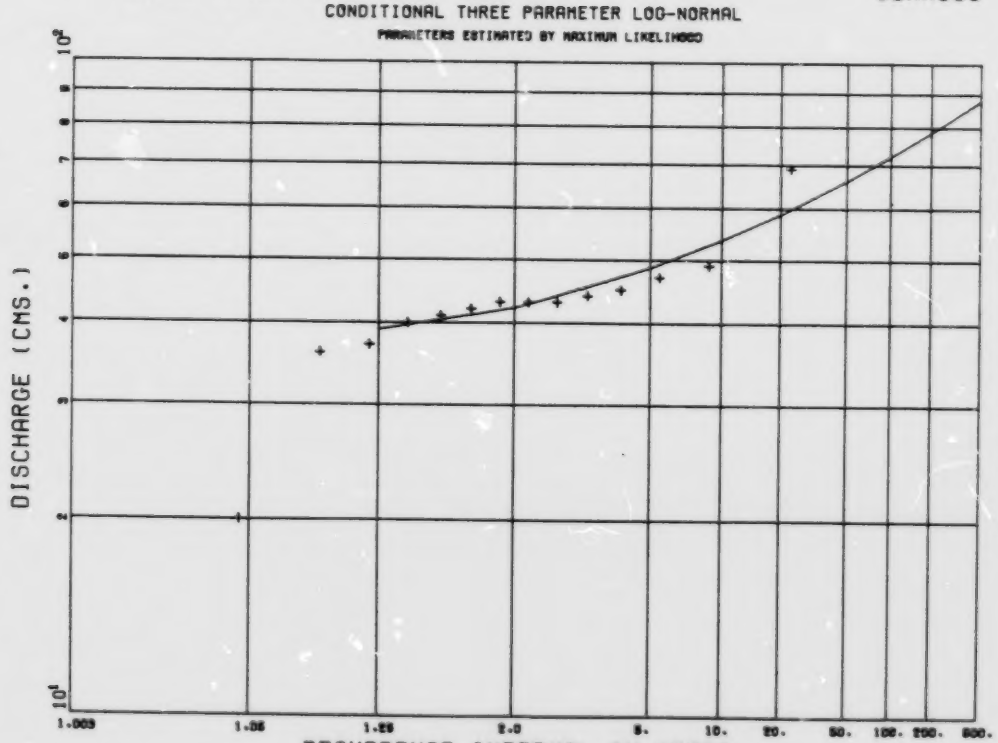
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	39.
2.000	.500	42.
2.330	.429	43.
5.000	.200	49.
10.000	.100	54.
20.000	.050	59.
50.000	.020	66.
100.000	.010	72.
200.000	.005	79.
500.000	.002	88.

CROWE RIVER NEAR GLEN ALDA 02HK005

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :182.0

CURRENT RIVER NEAR STEPSTONE 02AB015

DRAINAGE AREA : 492.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1993

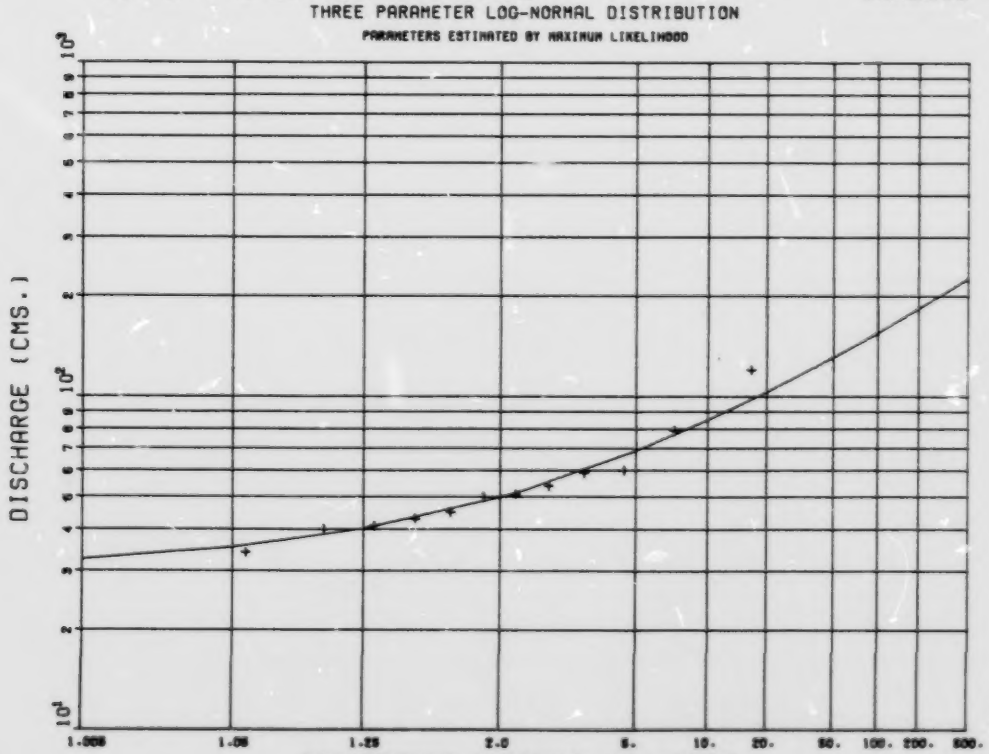
SAMPLE STATISTICS
MEAN = 56. S.D. = 23.3 C.S. = 2.1270 C.K. = 9.1629
SAMPLE STATISTICS (LOGS)
MEAN = 3.9715 S.D. = .3400 C.S. = 1.2966 C.K. = 6.1465
SAMPLE MIN = 34. SAMPLE MAX = 120. N = 12

PARAMETERS FOR GUMBEL I A = .076752 U = 48.
PARAMETERS FOR LOGNORMAL M = 3.9715 S = .3400
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 33. M = 2.9930 S = .7913
STATISTICS OF LOG(X-A)
MEAN = 2.9930 S.D. = .7913 C.S. = -.004 C.K. = 4.8526
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .220 B = .2379E+01 LOG(M) = 3.4470
ME= .3141E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .2087 B = .2481E+01
LOG(M)F= 3.4516 M = .3155E+02
DISTRIBUTION STATISTICS MEAN = 3.9715 S.D. = .3294 C.S. = 1.2671

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	26.		22.		32.		33.		33.	
1.050	33.		30.		35.		36.		35.	
1.250	41.		40.		40.		40.		40.	
2.000	52.		53.		51.		51.		50.	
2.330	55.	8.66	56.	9.89	53.	12.30	53.	0.00	52.	12.80
5.000	67.	10.10	71.	11.40	69.	15.10	67.	0.00	68.	15.50
10.000	77.	11.30	82.	13.20	85.	20.50	82.	0.00	83.	20.80
20.000	86.	12.30	93.	15.10	103.	26.50	100.	0.00	103.	28.00
50.000	98.	13.40	107.	17.30	131.	34.70	127.	0.00	132.	38.90
100.000	107.	14.10	117.	18.90	155.	40.70	152.	0.00	159.	46.20
200.000	117.	14.70	127.	20.40	183.	46.60	182.	0.00	191.	55.30
500.000	129.	15.40	141.	22.30	225.	54.20	230.	0.00	244.	67.80

F.E. = FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

CURRENT RIVER NEAR STEPSTONE 02AB015
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 183.0

DEDRICH CREEK NEAR PORT ROWAN 02GC013

DRAINAGE AREA : 75.9 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1964 - 1982

SAMPLE STATISTICS
MEAN = 16. S.D. = 9.9 C.S. = 1.1972 C.K. = 4.6683
SAMPLE STATISTICS (LOGS)
MEAN = 2.5655 S.D. = .6144 C.S. = .2354 C.K. = 2.4960
SAMPLE MIN = 6. SAMPLE MAX = 41. N = 19

PARAMETERS FOR GUMBEL I A = .148579 U = 11.
PARAMETERS FOR LOGNORMAL M = 2.5655 S = .6144

NO MAXIMUM LIKELIHOOD SOLUTION FOR THREE PARAMETER LOGNORMAL

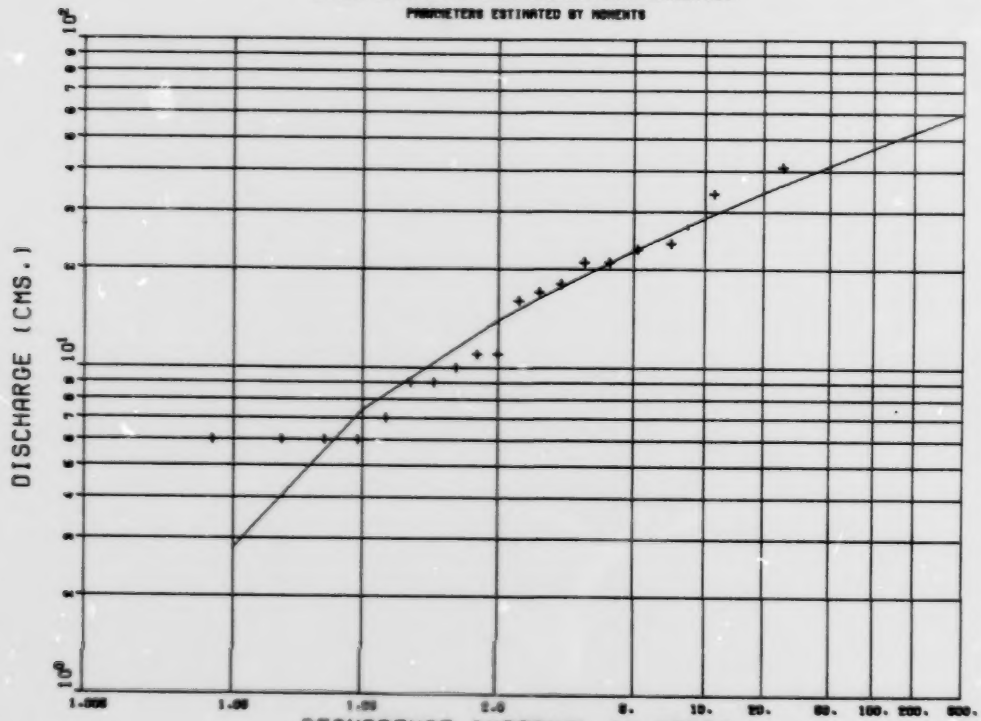
PARAMETERS FOR THREE PARAMETER LOG NORMAL BY MOMENTS A = -.1153E+02 M = 3.1948 S = .3679
STATISTICS OF LOG(X-A)
MEAN = 3.2017 S.D. = .3492 C.S. = .5839 C.K. = 3.0867
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8723 B = .7219E+02 LOG(M) =-2.6552
ME= .7029E-01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	0.		3.		-1.		0.		3.	
1.050	4.		5.		3.		0.		5.	
1.250	8.		8.		7.		0.		8.	
2.000	14.		13.		14.		0.		13.	
2.330	15.	12.90	15.	14.20	16.	18.20	0.	0.00	14.	15.50
5.000	21.	13.00	22.	16.40	23.	15.30	0.	0.00	22.	17.50
10.000	27.	13.50	29.	19.00	29.	16.10	0.	0.00	29.	21.40
20.000	31.	13.90	36.	21.60	34.	19.80	0.	0.00	37.	27.00
50.000	38.	14.50	46.	24.90	41.	26.70	0.	0.00	50.	36.00
100.000	42.	14.80	54.	27.10	47.	32.30	0.	0.00	60.	43.60
200.000	47.	15.00	63.	29.30	52.	37.90	0.	0.00	73.	51.60
500.000	53.	15.30	76.	32.80	60.	45.30	0.	0.00	91.	62.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

DEDRICH CREEK NEAR PORT ROWAN 02GC013
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 184.0

DEPOT CREEK AT BELLROCK 02HM002

DRAINAGE AREA : 189.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1957 - 1982

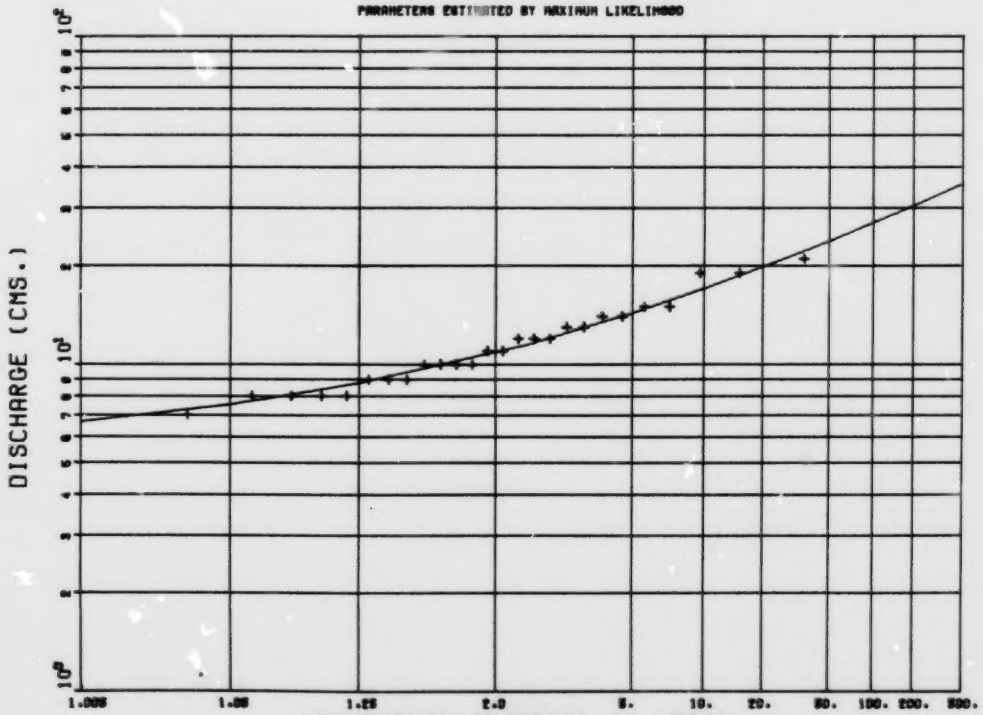
SAMPLE STATISTICS
MEAN = 12. S.D. = 3.7 C.S. = 1.0257 C.K. = 3.9471
SAMPLE STATISTICS (LOGS)
MEAN = 2.4259 S.D. = .2932 C.S. = .4563 C.K. = 2.9485
SAMPLE MIN = 7. SAMPLE MAX = 21. N = 26

PARAMETERS FOR GUMBEL I A = .376990 U = 10.
PARAMETERS FOR LOGNORMAL M = 2.4259 S = .2932
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 6. M = 1.6727 S = .5988
STATISTICS OF LOG(X-A)
MEAN = 1.6727 S.D. = .5988 C.S. = -.1352 C.K. = 2.8949
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0869 B = .1921E+02 LOG(M) = 1.1406
ME= .3129E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1350 B = .4869E+01
LOG(P)F= 1.7684 M = .5862E+01
DISTRIBUTION STATISTICS MEAN = 2.4259 S.D. = .2980 C.S. = .9064

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6.		5.		7.		7.		6.	
1.050	7.		7.		8.		8.		7.	
1.250	9.		9.		9.		9.		9.	
2.000	11.		11.		11.		11.		11.	
2.330	12.	5.63	12.	5.80	11.	6.39	11.	6.14	12.	6.43
5.000	14.	6.62	15.	6.59	14.	8.40	14.	8.30	14.	7.52
10.000	16.	7.44	17.	7.76	17.	11.00	17.	11.00	17.	9.53
20.000	18.	8.14	18.	8.82	20.	14.00	20.	14.20	19.	12.40
50.000	21.	8.91	21.	10.10	24.	18.20	24.	18.90	22.	16.90
100.000	22.	9.39	22.	11.10	27.	21.50	27.	22.70	25.	20.80
200.000	24.	9.81	24.	11.90	30.	24.70	31.	26.60	27.	24.80
500.000	27.	10.30	26.	13.00	35.	28.90	37.	32.10	31.	30.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

DEPOT CREEK AT BELLROCK 02HM002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 185.0
1- 88

DINGMAN CREEK BELOW LAMBETH 02GE005

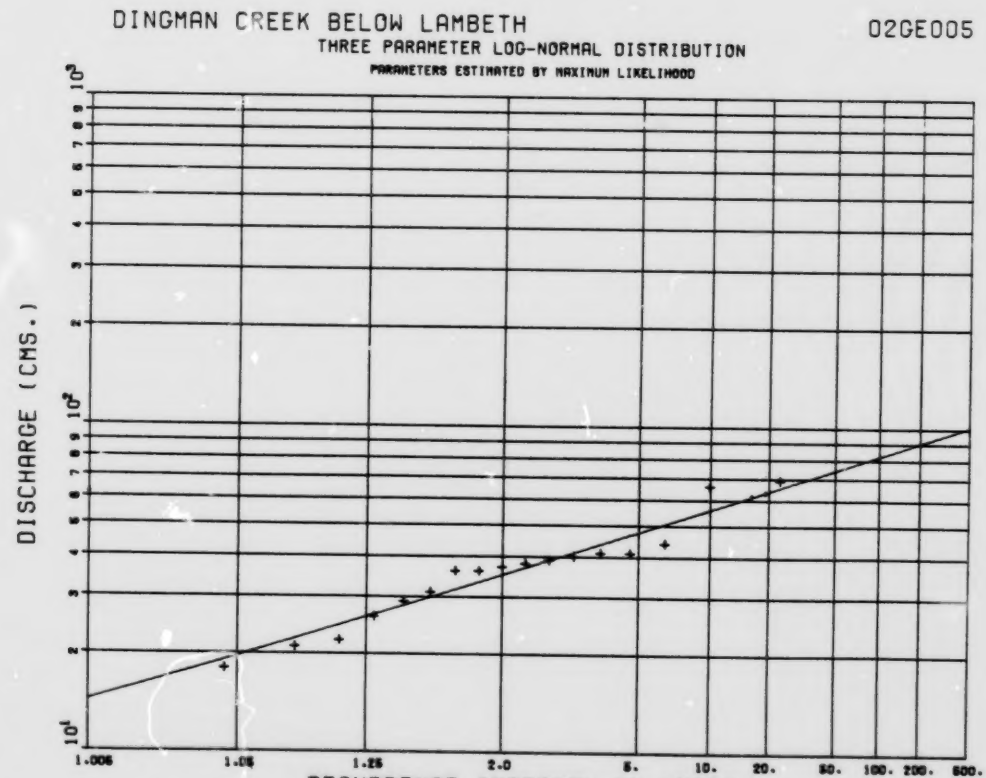
DRAINAGE AREA = 146.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 37. S.D. = 13.7 C.S. = 1.0527 C.K. = 5.0455
SAMPLE STATISTICS (LOGS)
MEAN = 3.5581 S.D. = .3591 C.S. = .0196 C.K. = 3.8206
SAMPLE MIN = 18. SAMPLE MAX = 69. N = 17

PARAMETERS FOR GUMBEL I A = .095808 U = 31.
PARAMETERS FOR LOGNORMAL P = 3.5581 S = .3591
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 3.4984 S = .3811
STATISTICS OF LOG(X-A)
MEAN = 3.4984 S.D. = .3811 C.S. = -.0399 C.K. = 3.8052
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0035 B = .1041E+05 LOG(M) =*******
ME= .4310E-14
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0037 B = .8768E+04
LOG(M)F=******* M = .2382E-12
DISTRIBUTION STATISTICS MEAN = 3.5581 S.D. = .3484 C.S. = .0214

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	14.		14.		14.		14.		14.	
1.050	20.		19.		20.		20.		20.	
1.250	26.		26.		26.		26.		26.	
2.000	35.		35.		35.		35.		35.	
2.330	37.	8.61	37.	8.78	37.	9.34	37.	9.16	37.	9.44
5.000	47.	9.72	48.	10.10	48.	10.30	47.	9.94	48.	10.20
10.000	55.	10.70	56.	11.80	56.	12.40	55.	11.70	56.	12.10
20.000	62.	11.50	63.	13.40	64.	15.60	62.	14.40	64.	14.80
50.000	72.	12.40	73.	15.40	74.	18.20	72.	18.80	74.	13.40
100.000	79.	12.90	81.	16.80	82.	21.30	79.	22.60	81.	23.30
200.000	87.	13.40	88.	18.10	93.	24.90	87.	26.60	89.	27.40
500.000	96.	13.90	99.	19.80	101.	28.80	97.	32.10	100.	33.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 186.0

DON RIVER AT TODMORDEN 02HC024

DRAINAGE AREA : 316.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	133.	32.	-.962	5.196
LN X SERIES	4.86	.28	-1.400	6.754

X(MIN)= 68. CMS. TOTAL SAMPLE SIZE= 11
X(MAX)= 174. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	140.	25.	-.832	5.493
LN X SERIES	4.92	.19	-1.141	6.100
LN (X-A) SERIES	4.06	.40	-.055	5.619

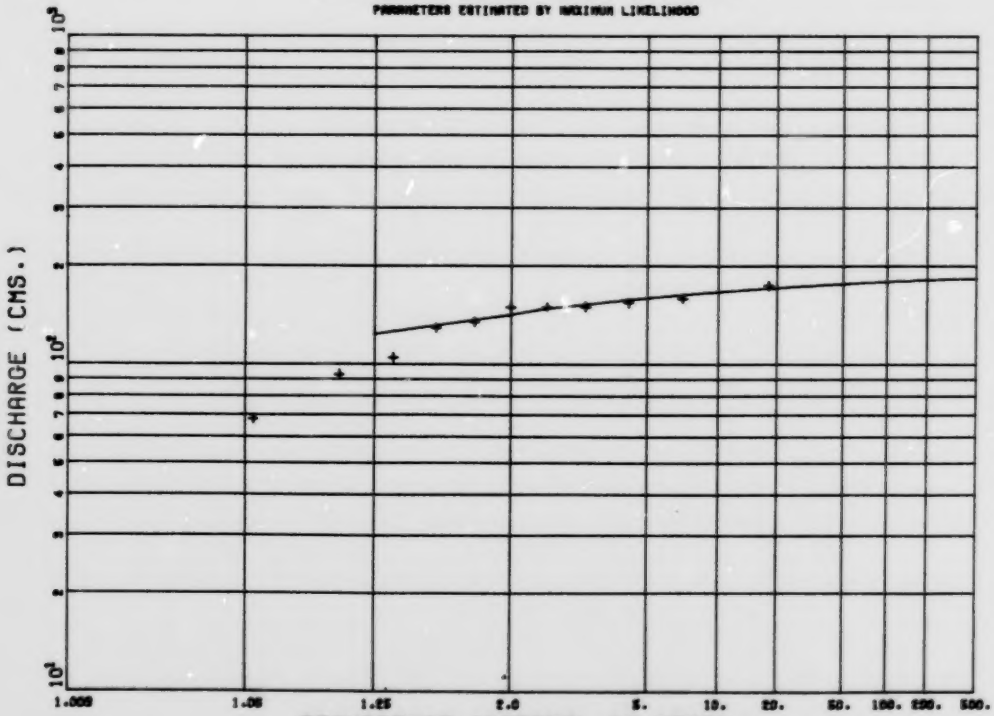
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 282.1008 M = 4.0636 S = .3965

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	123.
2.000	.500	141.
2.330	.429	146.
5.000	.200	159.
10.000	.100	166.
20.000	.050	171.
50.000	.020	176.
100.000	.010	179.
200.000	.005	181.
500.000	.002	183.

DON RIVER AT TODMORDEN 02HC024
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I87.0

DON RIVER AT YORK MILLS 02HC005

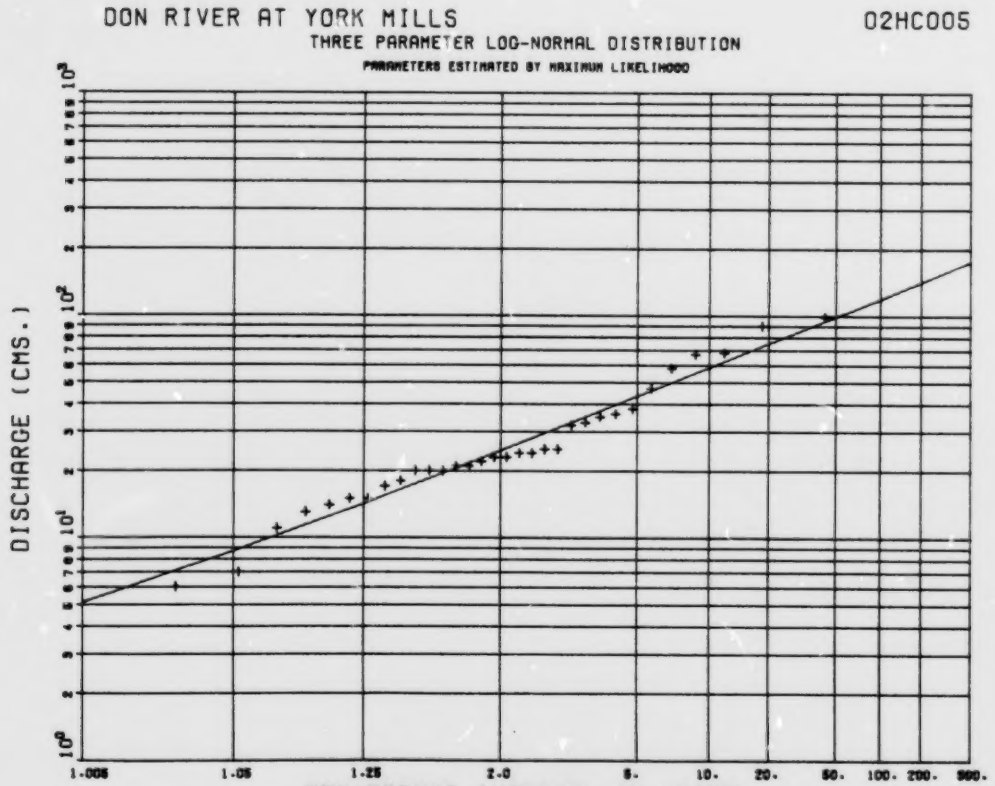
DRAINAGE AREA : 28.1 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1951 - 1982

SAMPLE STATISTICS
MEAN = 71. S.D. = 22.6 C.S. = 1.7171 C.K. = 5.8724
SAMPLE STATISTICS (LOGS)
MEAN = 3.2150 S.D. = .6548 C.S. = .1793 C.K. = 3.5536
SAMPLE MIN = 6. SAMPLE MAX = 99. N = 32

PARAMETERS FOR GUMBEL I A = .073641 U = 22.
PARAMETERS FOR LOGNORMAL M = 3.2150 S = .6548
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 3.1508 S = .6971
STATISTICS OF LOG(X-A)
MEAN = 3.1508 S.D. = .6971 C.S. = .0415 C.K. = 3.6608
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0587 B = .1244E+03 LOG(M) =-4.0870
ME= .1679E-01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0513 B = .1540E+03
LOG(M)F=-4.7401 M = .8396E-02
DISTRIBUTION STATISTICS MEAN = 3.2150 S.D. = .6444 C.S. = .1612

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-1.		5.		5.		5.		5.	
1.050	7.		8.		9.		9.		9.	
1.250	15.		14.		14.		14.		14.	
2.000	27.		25.		25.		25.		24.	
5.000	42.	10.30	40.	11.70	40.	12.30	40.	12.40	40.	12.70
10.000	52.	10.60	58.	15.60	58.	16.70	58.	16.80	58.	17.20
20.000	62.	10.90	73.	17.80	75.	19.90	74.	20.90	73.	21.50
50.000	75.	11.10	96.	20.40	99.	24.30	98.	27.50	102.	26.50
100.000	84.	11.50	114.	22.30	119.	27.40	120.	33.10	124.	34.40
200.000	94.	11.70	135.	24.10	142.	30.50	144.	38.90	150.	40.70
500.000	106.	11.90	164.	26.30	175.	34.50	181.	47.10	190.	49.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I88.0

DUCHESNAY RIVER NEAR NORTH BAY 02DD008

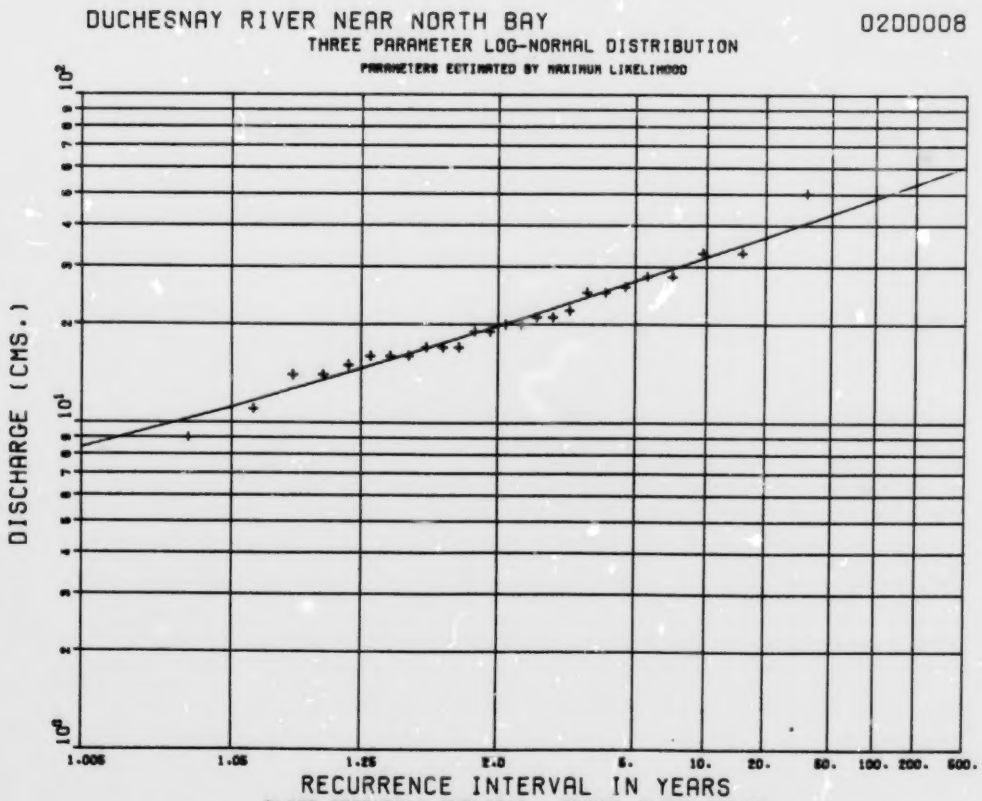
DRAINAGE AREA : 98.4 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1957 - 1982

SAMPLE STATISTICS
MEAN = 21. S.D. = 8.5 C.S. = 1.6820 C.K. = 7.6220
SAMPLE STATISTICS (LOGS)
MEAN = 2.9894 S.D. = .3641 C.S. = .2846 C.K. = 4.2139
SAMPLE MIN = 9. SAMPLE MAX = 50. N = 26

PARAMETERS FOR GUMBEL I A = .158817 U = 18.
PARAMETERS FOR LOGNORMAL M = 2.9894 S = .3641
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 2.8336 S = .4241
STATISTICS OF LOG(X-A)
MEAN = 2.8336 S.D. = .4241 C.S. = .0631 C.K. = 4.2161
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0518 B = .4937E+02 LOG(M) = .4309
ME= .1539E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0371 B = .9246E+02
LOG(M)F= -.4403 M = .6438E+00
DISTRIBUTION STATISTICS MEAN = 2.9894 S.D. = .3567 C.S. = .2080

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	8.		8.		8.		9.		9.	
1.050	11.		11.		11.		11.		11.	
1.250	15.		15.		15.		15.		15.	
2.000	20.		20.		20.		20.		20.	
3.330	24.	6.98	24.	7.20	24.	7.71	24.	7.61	24.	7.87
5.000	27.	7.88	27.	8.31	27.	8.72	27.	8.62	27.	8.97
10.000	31.	8.66	32.	9.64	32.	10.60	32.	10.50	32.	11.10
20.000	35.	9.31	36.	11.00	37.	12.90	37.	13.10	37.	14.10
50.000	41.	10.00	42.	12.60	43.	16.20	43.	17.30	44.	18.90
100.000	45.	10.40	46.	13.70	48.	18.80	48.	20.80	50.	22.90
200.000	49.	10.80	51.	14.80	53.	21.40	53.	24.50	56.	27.10
500.000	55.	11.20	57.	16.20	60.	24.80	61.	29.70	64.	33.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I89.0

DUFFINS CREEK ABOVE PICKERING 02HC019

DRAINAGE AREA = 93.5 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 40. S.D. = 23.9 C.S. = 1.9134 C.K. = 8.6194
SAMPLE STATISTICS (LOGS)
MEAN = 3.5394 S.D. = .5504 C.S. = .0162 C.K. = 4.4218
SAMPLE MIN = 11. SAMPLE MAX = 113. N = 17

PARAMETERS FOR GUMBEL I A = .065138 U = 30.
PARAMETERS FOR LOGNORMAL M = 3.5394 S = .5504
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -0. M = 3.5449 S = .5473
STATISTICS OF LOG(X-A)
MEAN = 3.5449 S.D. = .5473 C.S. = .0264 C.K. = 4.4202
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0045 B = .1517E+05 LOG(M) = ********
ME= .1240E-27

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

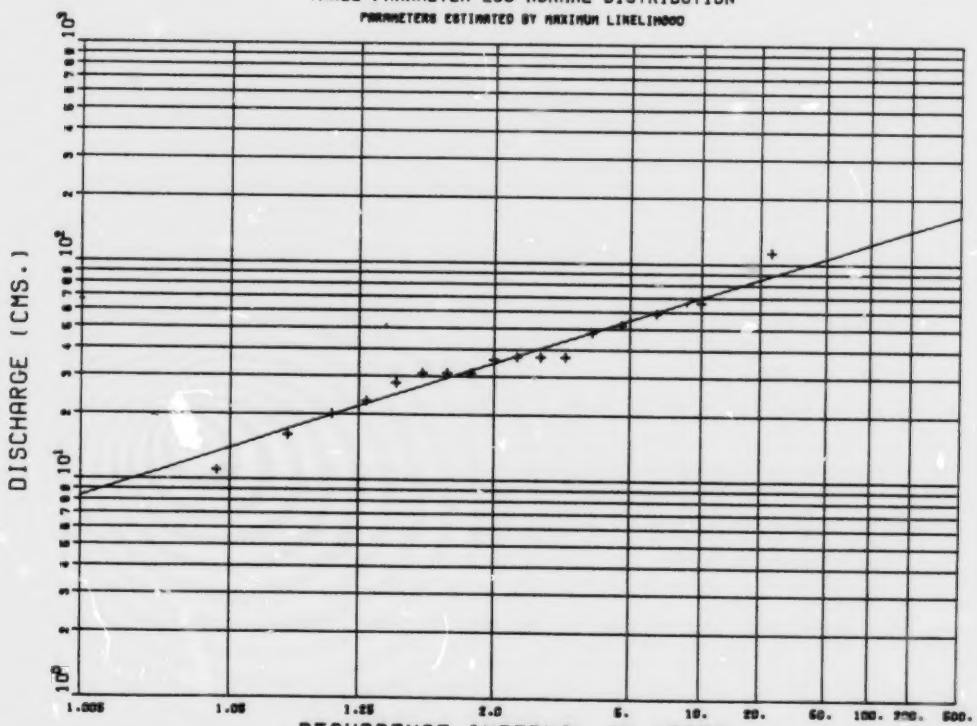
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	5.		8.		8.		0.		8.	
1.050	13.		14.		14.		0.		14.	
1.250	23.		22.		22.		0.		22.	
2.000	36.		34.		35.		0.		34.	
2.330	39.	12.10	38.	13.50	38.	14.10	0.	0.00	38.	14.50
5.000	53.	12.60	55.	15.50	55.	15.50	0.	0.00	55.	15.70
10.000	65.	13.30	78.	18.00	70.	18.50	0.	0.00	70.	18.50
20.000	76.	13.90	85.	20.50	85.	22.10	0.	0.00	85.	22.70
50.000	90.	14.50	107.	23.50	106.	27.10	0.	0.00	107.	29.70
100.000	101.	14.90	124.	25.70	124.	30.90	0.	0.00	125.	35.60
200.000	112.	15.30	142.	27.70	142.	34.70	0.	0.00	143.	41.80
500.000	126.	15.60	168.	30.30	167.	39.50	0.	0.00	170.	50.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

DUFFINS CREEK ABOVE PICKERING 02HC019

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I90.0

DUFFINS CREEK AT PICKERING 02HC006

DRAINAGE AREA : 249.8 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1949 - 1977

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	78.	36.	.121	2.742
LN X SERIES	4.21	.52	-1.104	5.221

X(MIN)= 10. CMS. TOTAL SAMPLE SIZE= 29
X(MAX)= 151. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

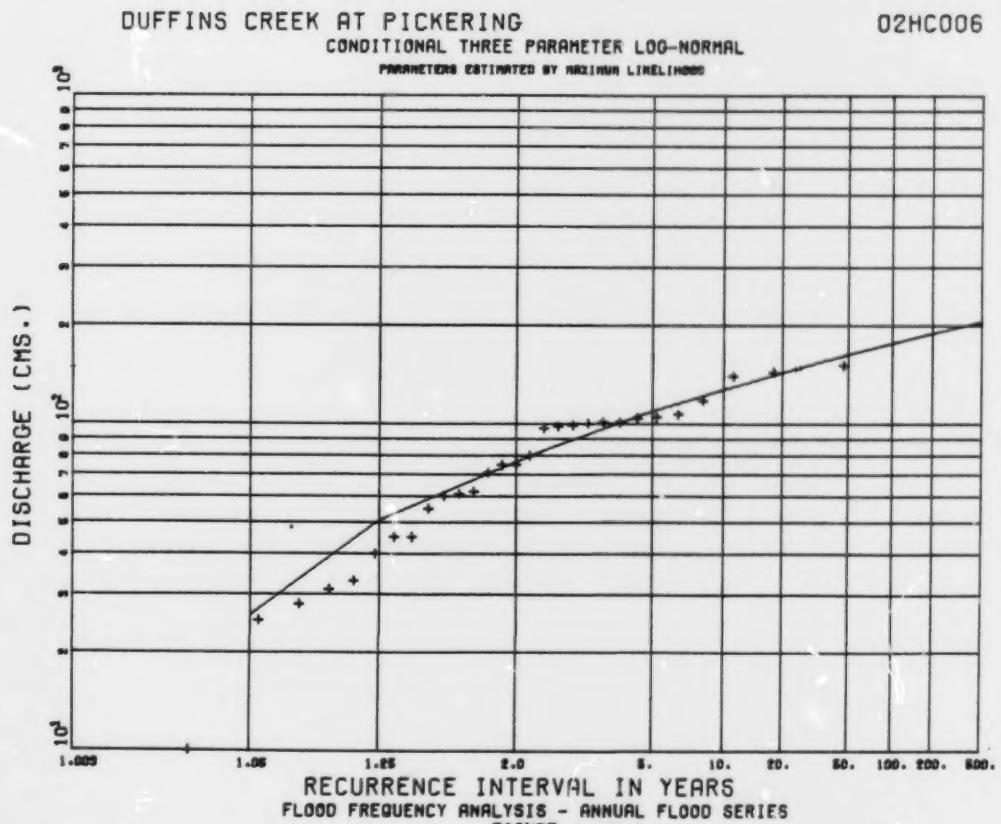
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	80.	36.	.198	2.729
LN X SERIES	4.27	.51	-.646	3.863
LN (X-A) SERIES	5.47	.15	-.051	2.562

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -158.5138 M = 5.4652 S = .1584

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	26.
1.250	.800	51.
2.000	.500	76.
2.330	.429	83.
5.000	.200	109.
10.000	.100	127.
20.000	.050	143.
50.000	.020	163.
100.000	.010	176.
200.000	.005	189.
500.000	.002	205.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 291.0

EAGLE RIVER AT EAGLE RIVER 05QD003

DRAINAGE AREA : 2510.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 50. S.D. = 27.5 C.S. = 1.2990 C.K. = 4.5502
SAMPLE STATISTICS (LOGS)
MEAN = 3.4936 S.D. = .6121 C.S. = .7582 C.K. = 3.0815
SAMPLE MIN = 19. SAMPLE MAX = 97. N = 12

PARAMETERS FOR GUMBEL I A = .3638E-05 U = 28.
PARAMETERS FOR LOGNORMAL M = 3.4936 S = .6121

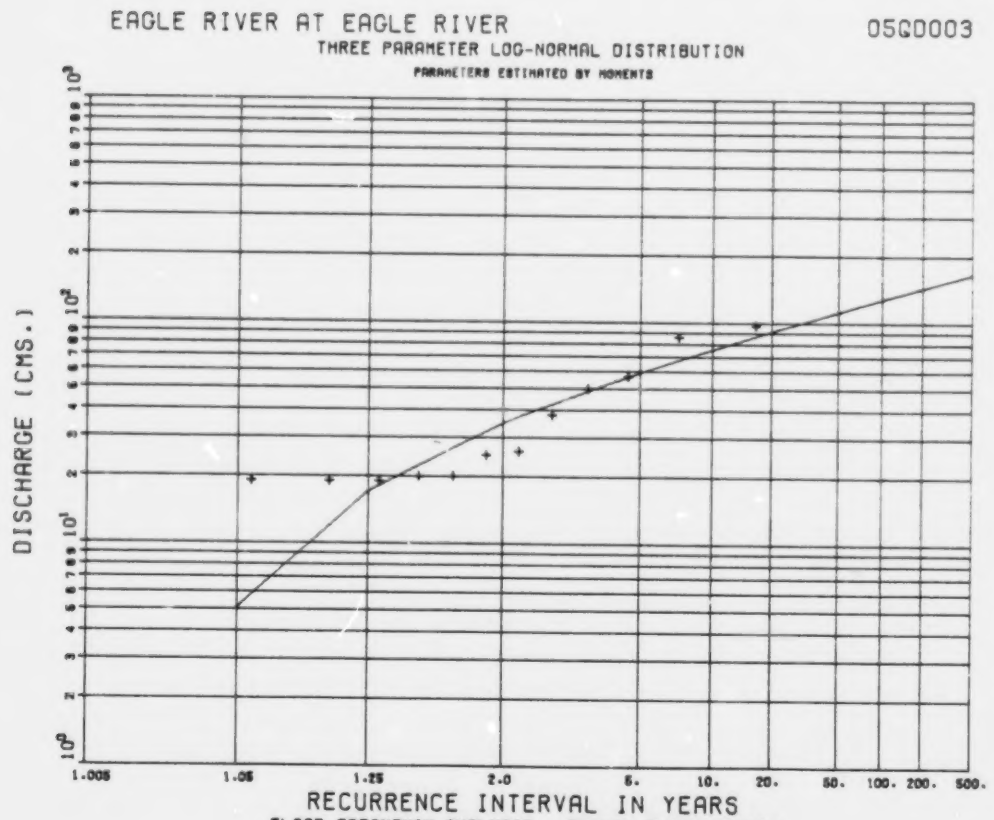
NO MAXIMUM LIKELIHOOD SOLUTION FOR THREE PARAMETER LOGNORMAL

PARAMETERS FOR THREE PARAMETER LOG NORMAL BY MOMENTS A = -.2733E+02 M = 4.1269 S = .3943
STATISTICS OF LOG(X-A)
MEAN = 4.193 S.D. = .3623 C.S. = .9674
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2351 B = .6777E+01 LOG(P) = 1.9002
ME= .5687E+01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		7.		-5.		1.		12.	
1.050	10.		12.		5.		9.		14.	
1.250	20.		25.		17.		14.		20.	
2.000	35.		38.		35.		0.		31.	
5.330	56.	16.10	57.	17.80	59.	25.70	0.	0.00	54.	20.60
10.000	63.	16.20	66.	20.60	69.	21.00	0.	0.00	63.	24.70
20.000	69.	16.30	75.	23.80	75.	31.60	0.	0.00	74.	32.60
50.000	78.	17.50	90.	27.10	91.	36.70	0.	0.00	101.	44.10
100.000	93.	18.10	119.	31.20	112.	38.30	0.	0.00	147.	62.90
200.000	105.	18.50	137.	34.00	128.	44.20	0.	0.00	191.	78.90
500.000	117.	18.90	159.	36.70	144.	52.20	0.	0.00	247.	96.00
	132.	19.20	192.	40.10	166.	62.70	0.	0.00	344.	120.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 192.0

EAST BR. SCOTCH R. NEAR ST. ISIDORE DE PRESCOTT 02LB012

DRAINAGE AREA 76.7 SQ. KM.
---NATUPAL FLCW---
PERIOD OF RECORD: 1970 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	23.	8.	.763	5.431
LN X SERIES	3.10	.35	-.369	5.586

X(MIN)= 13. CMS. TOTAL SAMPLE SIZE= 14
X(MAX)= 42. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	24.	7.	1.233	5.469
LN X SERIES	3.16	.25	.728	4.135
LN (X-A) SERIES	1.64	1.08	-.375	3.414

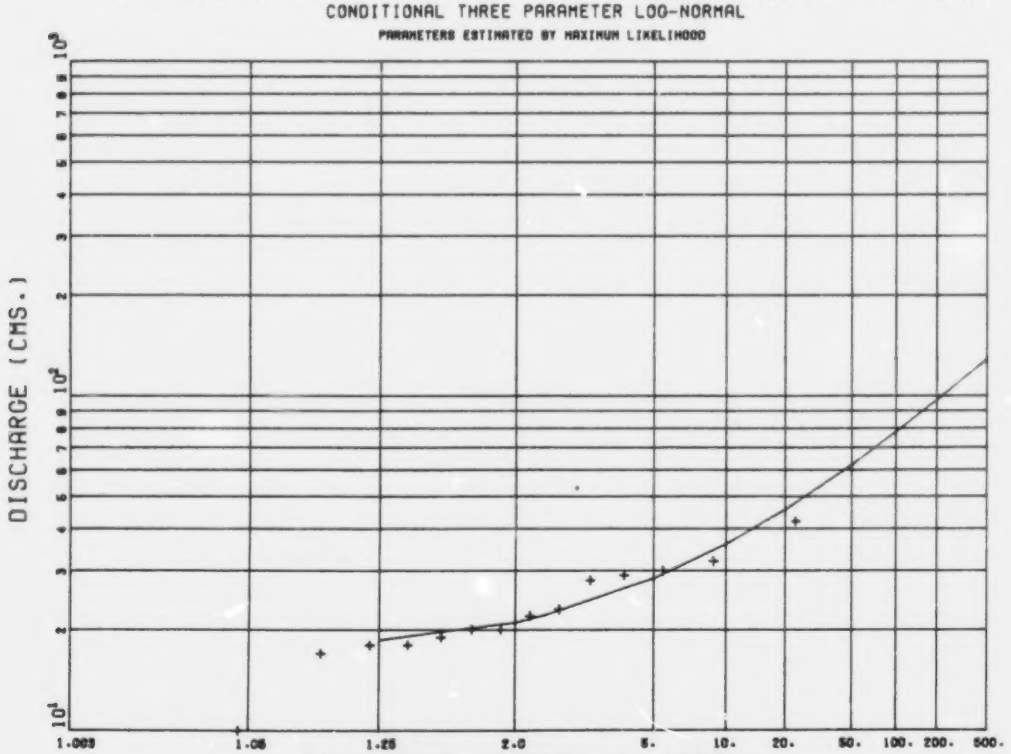
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 16.3604 Y = 1.6396 S = 1.0785

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	19.
2.000	.500	21.
2.330	.429	22.
5.000	.200	28.
10.000	.100	36.
20.000	.050	46.
50.000	.020	62.
100.000	.010	78.
200.000	.005	97.
500.000	.002	128.

EAST BR. SCOTCH R. NEAR ST. ISIDORE DE PRESCOTT 02LB012
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I93.0

EAST CANAGAGIGUE CREEK NEAR FLORADALE 02GA035

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA = 27.7 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1971 - 1983

SAMPLE STATISTICS
MEAN = 1572. S.D. = 668.6 C.S. = .2892 C.K. = 2.7568
SAMPLE STATISTICS (LOGS)
MEAN = 7.2695 S.D. = .4544 C.S. = -.2470 C.K. = 2.7475
SAMPLE MIN = 657. SAMPLE MAX = 2670. N = 13

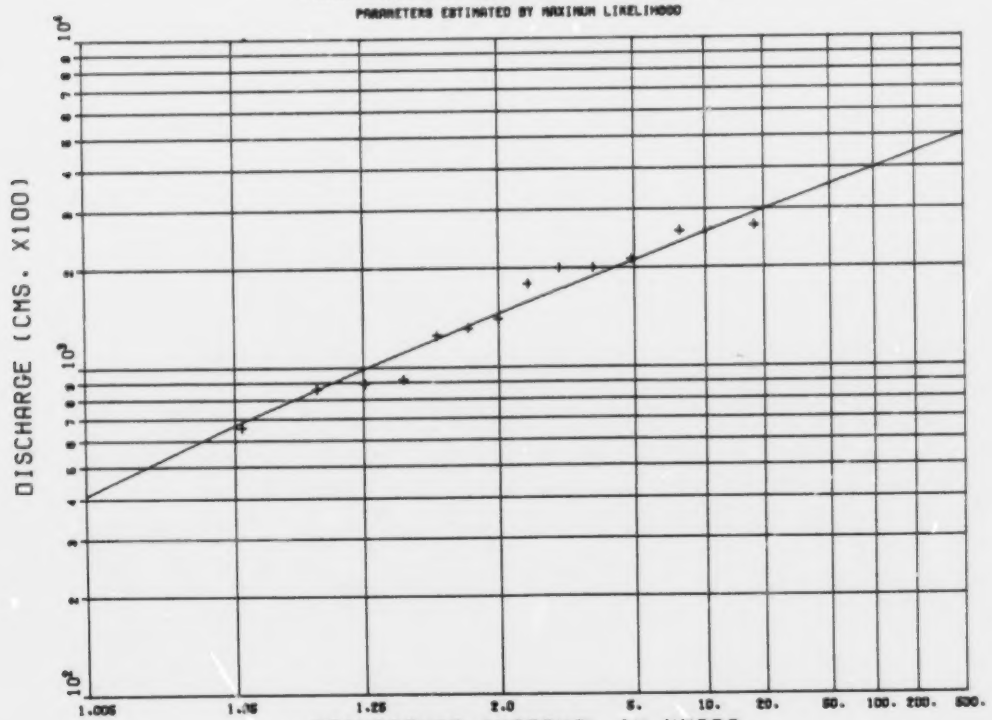
PARAMETERS FOR GUMBEL I A = .001853 U = 1261.
PARAMETERS FOR LOGNORMAL M = 7.2695 S = .4544
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -158. M = 7.3828 S = .4056
STATISTICS OF LOG(X-A)
MEAN = 7.3828 S.D. = .4056 C.S. = -.1876 C.K. = 2.6940
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.9561 B = .6255E+02 LOG(M) =18.9484
ME= .5666E+05

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	361.		445.		408.		0.		401.	
1.050	660.		688.		667.		0.		660.	
1.250	1000.		979.		985.		0.		986.	
2.000	1460.		1440.		1458.		0.		1460.	
2.330	1570.	12.10	1568.	12.70	1570.	13.20	0.	0.00	1580.	13.50
5.000	2070.	13.00	2118.	14.70	2108.	14.10	0.	0.00	2110.	13.80
10.000	2480.	14.00	2570.	17.00	2558.	16.60	0.	0.00	2540.	15.40
20.000	2860.	14.80	3038.	19.20	3040.	19.80	0.	0.00	2930.	16.50
50.000	3370.	15.60	3658.	22.50	3700.	24.30	0.	0.00	3430.	24.10
100.000	3740.	16.20	4138.	24.30	4018.	28.10	0.	0.00	3800.	28.90
200.000	4120.	16.60	4638.	26.20	4410.	31.80	0.	0.00	4170.	34.00
500.000	4610.	17.10	5310.	28.60	5010.	36.50	0.	0.00	4650.	41.20

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

EAST CANAGAGIGUE CREEK NEAR FLORADALE 02GA035
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I94.0

EAST HUMBER RIVER AT KING CREEK 02HC032

DRAINAGE AREA : 94.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	14.	5.	-.879	3.856
LN X SERIES	2.58	.44	-1.279	6.392

X(MIN)= 4. CMS. TOTAL SAMPLE SIZE= 17
X(MAX)= 24. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	15.	5.	-.243	3.728
LN X SERIES	2.65	.33	-.489	4.117
LN (X-A) SERIES	3.60	.12	-.028	3.660

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -22.1459 M = 3.6043 S = .1240

FLOOD FREQUENCY REGIME

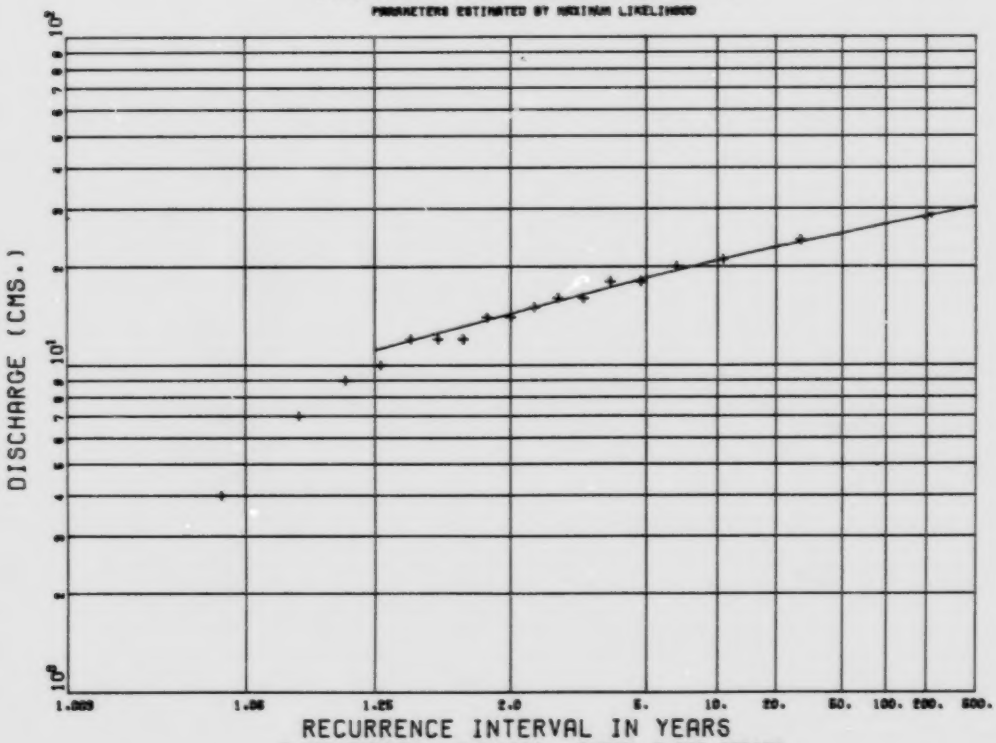
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	11.
2.000	.500	14.
2.330	.429	15.
5.000	.200	18.
10.000	.100	21.
20.000	.050	23.
50.000	.020	25.
100.000	.010	27.
200.000	.005	28.
500.000	.002	30.

EAST HUMBER RIVER AT KING CREEK 02HC032

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : 195.0

EAST HUMBER RIVER NEAR PINE GROVE 02HC009

DRAINAGE AREA = 197.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1954 - 1982

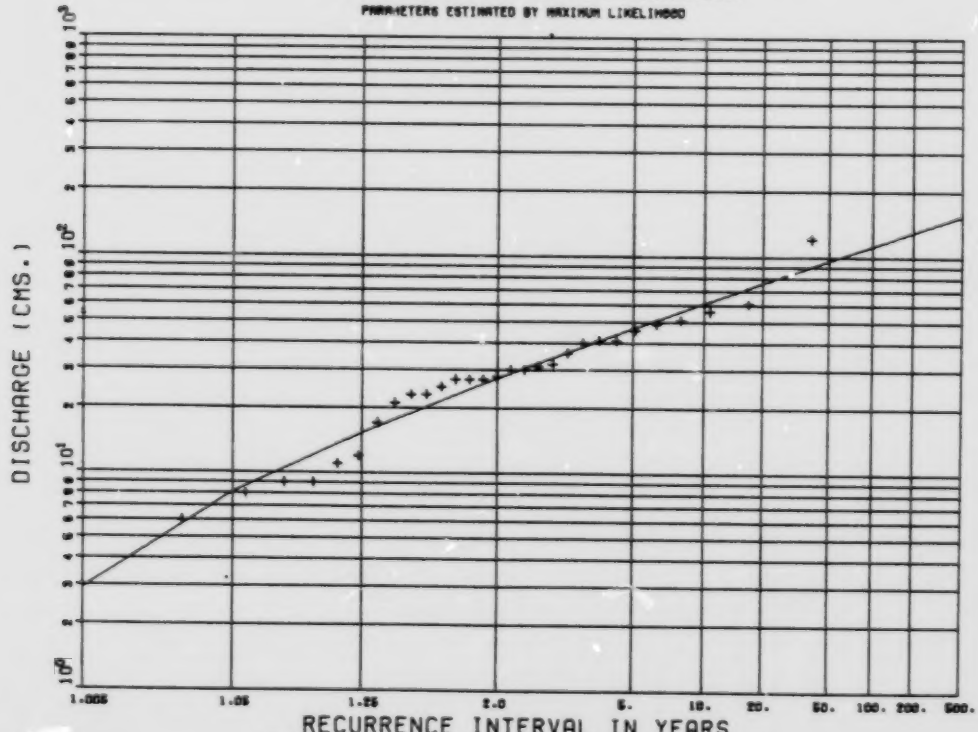
SAMPLE STATISTICS
MEAN = 32. S.D. = 22.5 C.S. = 2.2266 C.K. = 11.1228
SAMPLE STATISTICS (LOGS)
MEAN = 3.2663 S.D. = .6834 C.S. = -.3497 C.K. = 3.4887
SAMPLE MIN = 6. SAMPLE MAX = 121. N = 29

PARAMETERS FOR GUMBEL I A = .067627 U = 23.
PARAMETERS FOR LOGNORMAL M = 3.2663 S = .6834
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -5. M = 3.4584 S = .5603
STATISTICS OF LOG(X-A)
MEAN = 3.4584 S.D. = .5603 C.S. = -.0491 C.K. = 3.5814
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1195 B = .3271E+02 LOG(M) = 7.1745
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1306E+04
A = -.1025 B = .4283E+02
LOG(M)F= 7.6554 M = .2112E+04
DISTRIBUTION STATISTICS MEAN = 3.2663 S.D. = .6706 C.S. = -.3056

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-1.		5.		3.		4.		4.	
1.050	7.		9.		8.		8.		8.	
1.250	16.		15.		15.		15.		15.	
2.000	29.		26.		27.		27.		27.	
5.000	45.	10.90	38.	12.80	41.	12.60	41.	13.20	41.	13.60
10.000	57.	11.20	47.	14.80	46.	13.50	46.	13.30	47.	13.40
20.000	67.	11.50	63.	17.10	61.	15.50	68.	14.80	61.	14.80
50.000	81.	11.90	81.	19.60	75.	18.20	74.	17.30	75.	17.70
100.000	91.	12.10	107.	22.40	92.	20.20	93.	20.10	94.	21.40
200.000	102.	12.30	128.	24.60	112.	22.10	117.	23.10	108.	27.90
500.000	115.	12.60	152.	26.40	139.	28.00	122.	30.50	122.	33.00
			168.	28.80	155.	31.70	142.	36.70	141.	40.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

EAST HUMBER RIVER NEAR PINE GROVE 02HC009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 196.0

EAST OAKVILLE CREEK AT DRUMQUIN 02HB204

DRAINAGE AREA = 28.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1977

SAMPLE STATISTICS
MEAN = 27. S.D. = 32.3 C.S. = 2.9847 C.K. = 13.5798
SAMPLE STATISTICS (LOGS)
MEAN = 2.9713 S.D. = .7712 C.S. = 1.1781 C.K. = 6.8888
SAMPLE MIN = 7. SAMPLE MAX = 122. N = 11

PARAMETERS FOR GUMBEL I A = .074667 U = 17.
PARAMETERS FOR LOGNORMAL M = 2.9713 S = .7712
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. N = 2.4691 S = 1.1782
STATISTICS OF LOG(X-A)
MEAN = 2.4691 S.D. = 1.1782 C.S. = -.0538 C.K. = 5.4648
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .4512 B = .2921E+01 LOG(M) = 1.6531
ME= .5223E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .3957 B = .3715E+01
LOG(M)= 1.5383 M = .4657E+01
DISTRIBUTION STATISTICS MEAN = 2.9713 S.D. = .7435 C.S. = 1.0376

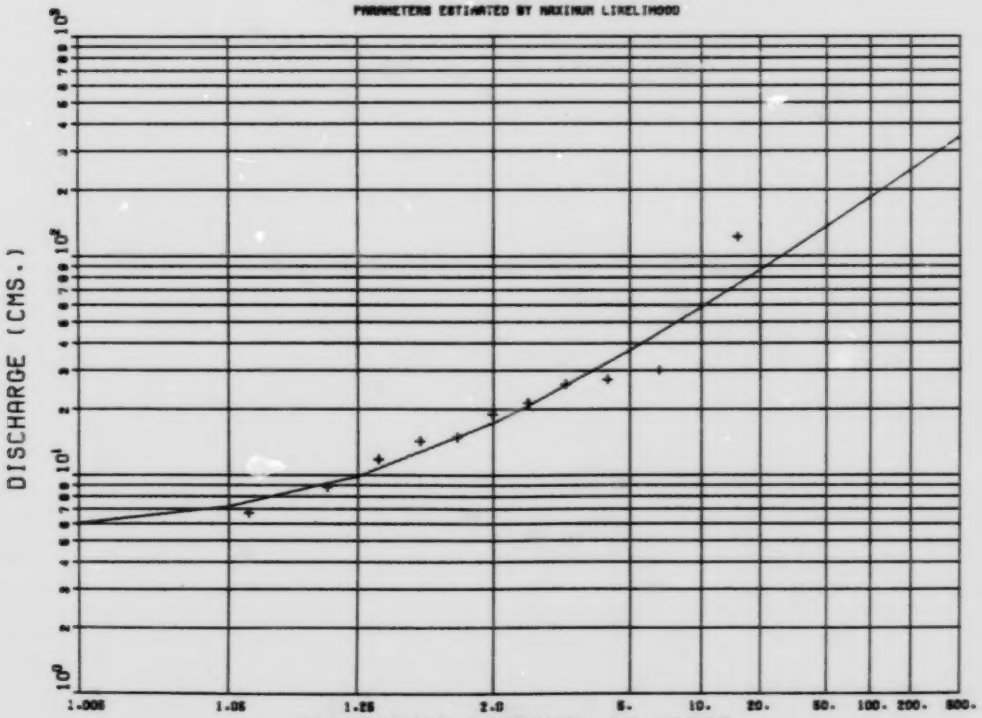
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-5.		3.		6.		6.		6.	
1.050	2.		5.		7.		7.		7.	
1.250	11.		10.		10.		10.		10.	
2.000	22.		20.		17.		17.		17.	
2.333	25.	20.50	22.	23.40	20.	25.20	20.	23.20	19.	22.30
5.000	37.	19.50	37.	27.10	37.	35.10	34.	32.50	34.	32.50
10.000	47.	19.70	53.	31.40	58.	44.00	53.	43.70	55.	47.90
20.000	57.	20.00	69.	35.70	86.	52.60	79.	56.50	84.	66.20
50.000	70.	20.40	95.	41.80	130.	63.20	131.	75.00	147.	103.00
100.000	79.	20.70	117.	44.80	185.	70.70	189.	89.80	228.	133.00
200.000	88.	20.90	142.	48.30	246.	77.60	271.	105.00	328.	166.00
500.000	100.	21.20	180.	52.80	349.	86.30	434.	127.00	553.	213.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

EAST OAKVILLE CREEK AT DRUMQUIN 02HB204

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 197.0
I-100

EAST OAKVILLE CREEK NEAR OMAGH 02HB004

DRAINAGE AREA : 139.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1957 - 1982

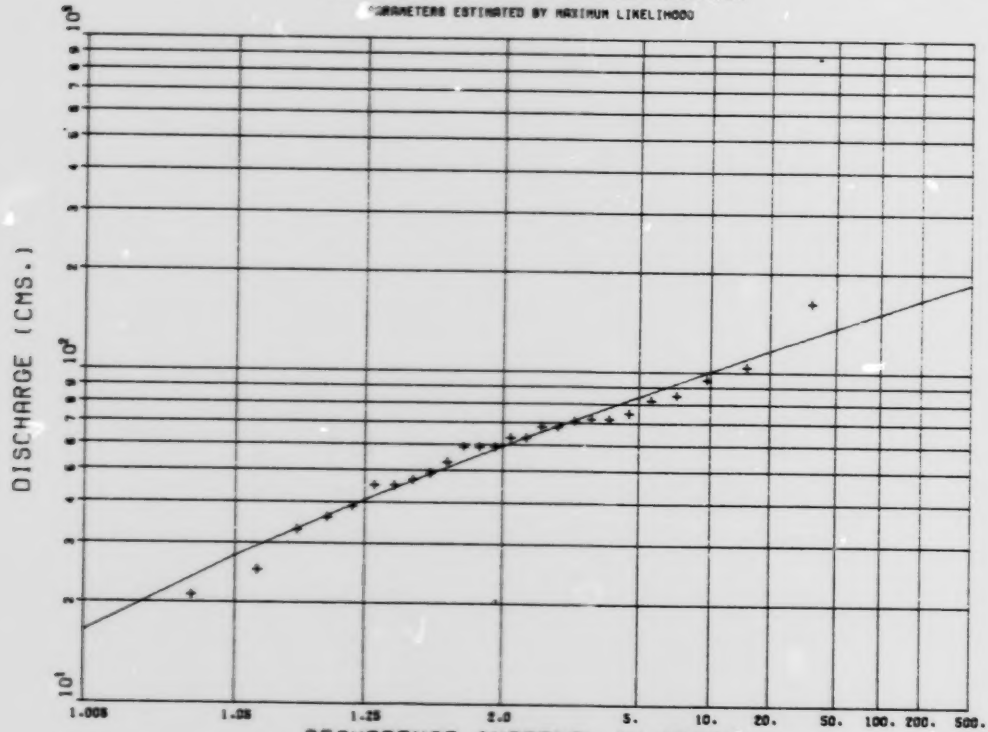
SAMPLE STATISTICS
MEAN = 63. S.D. = 28.6 C.S. = 1.5382 C.K. = 8.0715
SAMPLE STATISTICS (LOGS)
MEAN = 4.0600 S.D. = .4393 C.S. = -.2457 C.K. = 4.2228
SAMPLE MIN = 21. SAMPLE MAX = 162. N = 25

PARAMETERS FOR GUMBEL I A = .047104 U = 51.
PARAMETERS FOR LOGNORMAL M = 4.0600 S = .4393
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -12. M = 4.2620 S = .3571
STATISTICS OF LOG(X-A)
MEAN = 4.2620 S.D. = .3571 C.S. = .0441 C.K. = 4.2577
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0540 B = .6527E+02 LOG(M) = 7.6359
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .2071E+04
A = -.0359 B = .1441E+03
LOG(M)= 9.2263 M = .1016E+05
DISTRIBUTION STATISTICS MEAN = 4.0600 S.D. = .4393 C.S. = -.1686

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	16.		19.		15.		18.		17.	
1.050	28.		28.		27.		28.		27.	
1.250	41.		40.		41.		41.		40.	
2.000	59.		58.		53.		59.		59.	
5.000	64.	8.31	53.	8.68	64.	8.68	53.	9.35	64.	9.26
10.000	83.	9.03	84.	10.00	84.	9.32	83.	9.43	84.	9.41
20.000	99.	9.72	102.	11.60	100.	10.90	100.	10.70	101.	10.60
50.000	114.	10.30	119.	13.20	116.	13.00	115.	12.90	116.	12.70
100.000	126.	10.90	143.	15.23	136.	16.00	136.	16.60	135.	16.50
200.000	149.	11.70	161.	16.60	151.	18.40	150.	19.80	149.	19.80
500.000	164.	11.60	180.	17.90	166.	20.80	164.	23.20	163.	23.30
	183.	12.20	205.	19.50	185.	23.90	184.	28.20	182.	28.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

EAST OAKVILLE CREEK NEAR OMAGH 02HB004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I98.0

EAST RIVER NEAR HUNTSVILLE 02EB013

DRAINAGE AREA = 593.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1974 - 1982

SAMPLE STATISTICS
MEAN = 108. S.D. = 35.2 C.S. = .3760 C.K. = 3.0998
SAMPLE STATISTICS (LOGS)
MEAN = 4.6298 S.D. = .3305 C.S. = .0393 C.K. = 3.1280
SAMPLE MIN = 65. SAMPLE MAX = 159. N = 9

PARAMETERS FOR GUMBEL I A = .036904 U = 92.
PARAMETERS FOR LOGNORMAL P = 4.6298 S = .3305
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 46. M = 3.9537 S = .6417
STATISTICS OF LOG(X-A)
MEAN = 3.9537 S.D. = .6417 C.S. = -.3217 C.K. = 3.4021
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0065 B = .2531E+04 LOG(P) = ********
ME= .6159E-05

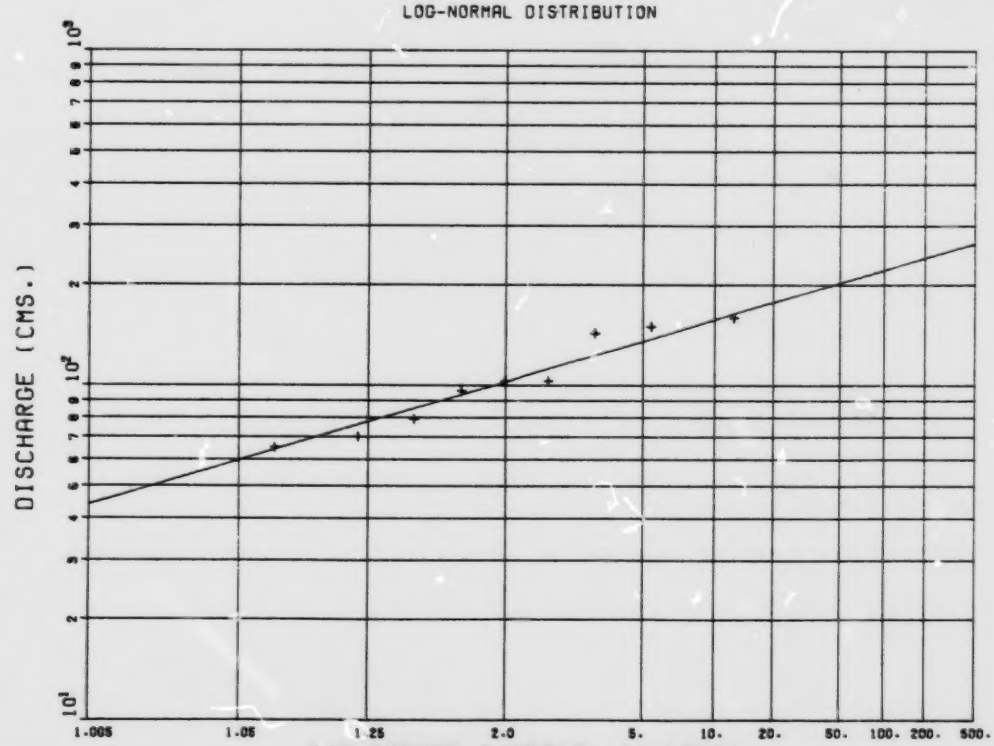
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	46.		44.		56.		0.		4*.	
1.050	62.		60.		64.		0.		60.	
1.250	79.		78.		76.		0.		7*.	
2.000	102.		102.		93.		0.		1**.	
2.***	107.	10.70	109.	11.10	104.	12.60	0.	0.00	135.	11.90
5.000	132.	12.30	135.	12.80	135.	16.50	0.	0.00	1**.	13.00
10.000	153.	13.70	157.	14.90	165.	21.40	0.	0.00	157.	15.40
20.000	172.	14.90	177.	16.90	195.	27.00	0.	0.00	177.	19.00
50.000	197.	16.20	202.	19.40	241.	34.80	0.	0.00	203.	24.80
100.000	216.	16.90	221.	21.20	276.	40.70	0.	0.00	223.	29.80
200.000	235.	17.60	240.	22.90	318.	46.50	0.	0.00	243.	35.10
500.000	260.	18.30	265.	25.00	377.	53.90	0.	0.00	270.	42.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

EAST RIVER NEAR HUNTSVILLE 02EB013

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I99.0

EELS CREEK BELOW APSLEY 02HH001

DRAINAGE AREA : 241.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1968 - 1982

SAMPLE STATISTICS
MEAN = 24. S.D. = 9.6 C.S. = 1.2914 C.K. = 6.0818
SAMPLE STATISTICS (LOGS)
MEAN = 3.1799 S.D. = .3553 C.S. = .2099 C.K. = 4.2188
SAMPLE MIN = 13. SAMPLE MAX = 50. N = 15

PARAMETERS FOR GUMBEL I A = .143878 U = 21.
PARAMETERS FOR LOGNORMAL M = 3.1799 S = .3553
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 4. M = 2.9628 S = .4396
STATISTICS OF LOG(X-A)
MEAN = 2.9628 S.D. = .4396 C.S. = -.0340 C.K. = 4.1191
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0373 B = .9065E+02 LOG(M) = -.2064
ME= .8135E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0363 B = .8936E+02
LOG(M)F= -.0662 M = .9359E+00
DISTRIBUTION STATISTICS MEAN = 3.1799 S.D. = .3434 C.S. = .2116

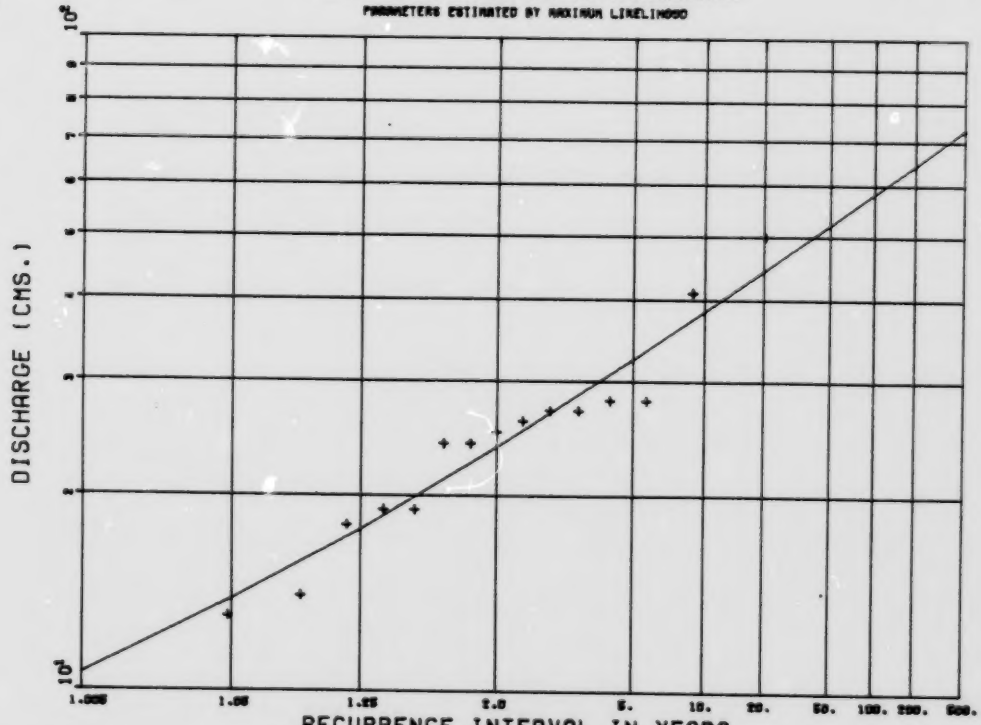
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	10.		10.		11.		11.		10.	
1.053	14.		13.		14.		14.		14.	
1.250	18.		18.		18.		18.		18.	
2.000	24.		24.		24.		24.		24.	
5.330	36.	8.95	36.	9.25	35.	9.97	35.	9.65	35.	10.00
10.000	42.	10.20	42.	10.70	42.	11.40	42.	10.90	42.	11.30
20.000	47.	11.20	48.	12.40	48.	14.00	48.	13.30	48.	13.80
50.000	52.	12.10	53.	14.10	54.	17.10	53.	16.70	54.	17.40
100.000	56.	13.00	58.	16.20	62.	21.60	61.	22.00	62.	23.10
200.000	61.	13.60	65.	17.70	68.	25.10	66.	26.40	68.	27.90
500.000	68.	14.10	68.	19.10	64.	28.50	62.	31.10	64.	32.90
	65.	14.60	67.	20.80	73.	33.10	71.	37.70	73.	40.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

EELS CREEK BELOW APSLEY 02HH001

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I100.0

EKWAN RIVER BELOW NORTH WASHAGAMI RIVER 04EA001

DRAINAGE AREA = 10400.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1968 - 1982

SAMPLE STATISTICS
MEAN = 780. S.D. = 268.5 C.S. = -.1276 C.K. = 2.6078
SAMPLE STATISTICS (LOGS)
MEAN = 6.5950 S.D. = .3868 C.S. = -.6889 C.K. = 3.4282
SAMPLE MIN = 329. SAMPLE MAX = 1180. N = 15

PARAMETERS FOR GUMBEL I A = .004133 U = 649.
PARAMETERS FOR LOGNORMAL M = 6.5950 S = .3868

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1332 B = .8429E+01 LOG(M) = 7.7185
ME= .2248E+04

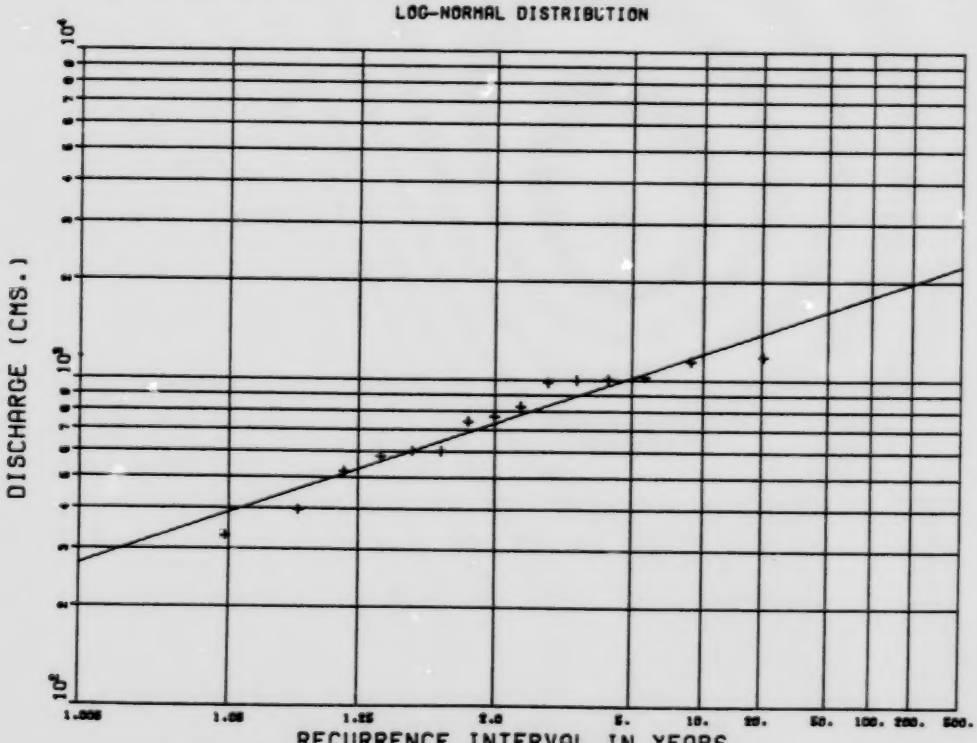
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	246.		278.		0.		0.		210.	
1.050	380.		387.		0.		0.		363.	
1.250	534.		528.		0.		0.		539.	
2.000	738.		731.		0.		0.		764.	
5.000	789.	10.00	784.	10.10	0.	0.00	0.	0.00	816.	10.80
10.000	1010.	11.10	1010.	11.60	0.	0.00	0.	0.00	1020.	9.42
20.000	1190.	12.10	1200.	13.50	0.	0.00	0.	0.00	1160.	9.89
50.000	1370.	12.90	1380.	15.30	0.	0.00	0.	0.00	1270.	12.30
100.000	1590.	13.80	1620.	17.60	0.	0.00	0.	0.00	1400.	17.10
200.000	1760.	14.30	1800.	19.20	0.	0.00	0.	0.00	1480.	21.20
500.000	1930.	14.80	1980.	20.80	0.	0.00	0.	0.00	1550.	25.50
	2150.	15.30	2230.	22.70	0.	0.00	0.	0.00	1640.	31.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

EKWAN RIVER BELOW NORTH WASHAGAMI RIVER 04EA001

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 2101.0

ENGLISH RIVER AT CARIBOU FALLS 05QE005

DRAINAGE AREA : 2300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1959 - 1982

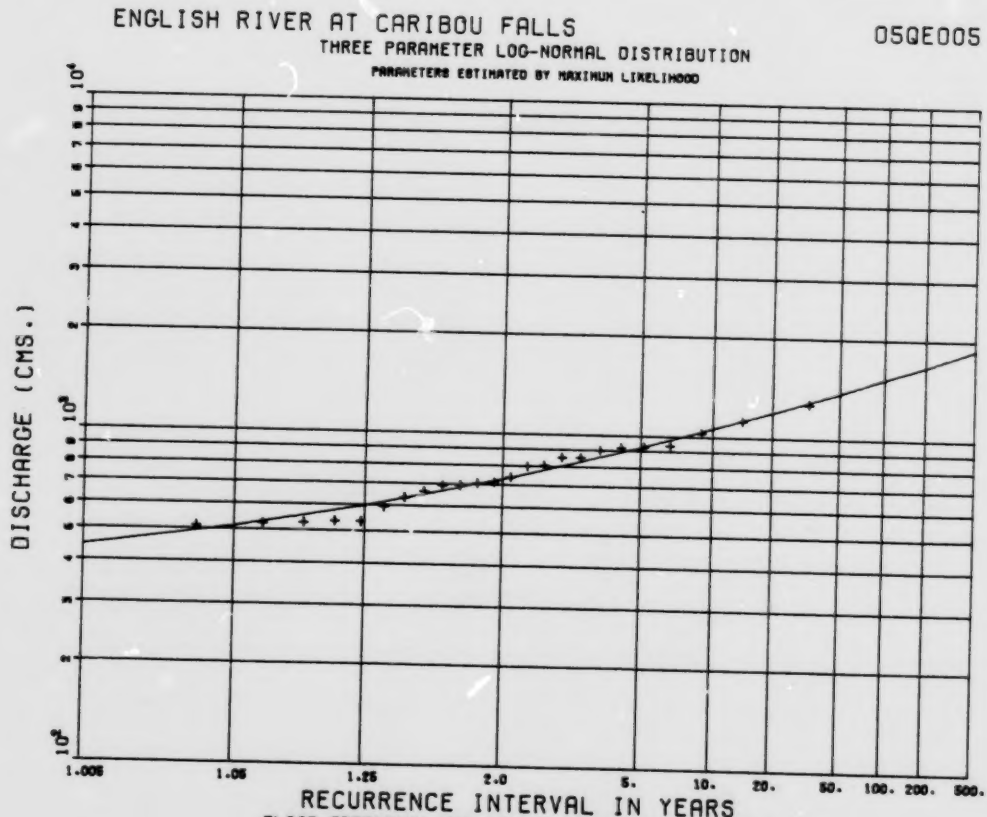
SAMPLE STATISTICS
MEAN = 770. S.D. = 200.8 C.S. = .6863 C.K. = 3.5974
SAMPLE STATISTICS (LOGS)
MEAN = 6.6143 S.D. = .2554 C.S. = .1718 C.K. = 2.7426
SAMPLE MIN = 511. SAMPLE MAX = 1269. N = 24

PARAMETERS FOR GUMBEL I A = .036332 U = 678.
PARAMETERS FOR LOGNORMAL M = 6.6143 S = .2554
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 322. M = 6.0050 S = .4646
STATISTICS OF LOG(X-A)
MEAN = 6.0050 S.D. = .4646 C.S. = -.1676 C.K. = 2.5625
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0219 B = .1355E+03 LOG(M) = 3.6413
ME= .3814E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	414.		386.		444.		0.		432.	
1.050	502.		490.		511.		0.		496.	
1.250	602.		601.		595.		0.		600.	
2.000	735.		746.		727.		0.		740.	
2.330	769.	5.32	780.	5.26	762.	5.81	0.	0.00	775.	5.70
5.000	914.	6.35	925.	6.37	921.	7.18	0.	0.00	922.	6.37
10.000	1030.	7.21	1030.	7.04	1059.	9.16	0.	0.00	1040.	7.73
20.000	1150.	7.95	1140.	8.00	1190.	11.60	0.	0.00	1150.	9.66
50.000	1290.	8.76	1260.	9.19	1370.	15.00	0.	0.00	1290.	12.80
100.000	1400.	9.28	1350.	10.00	1520.	17.70	0.	0.00	1390.	15.40
200.000	1510.	9.73	1440.	10.80	1660.	20.50	0.	0.00	1500.	18.20
500.000	1660.	10.20	1560.	11.80	1873.	24.10	0.	0.00	1640.	22.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I102.0

ENGLISH RIVER AT EAR FALLS (1929-82) 05QE006

DRAINAGE AREA : 26400.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1929 - 1982

SAMPLE STATISTICS
MEAN = 426. S.D. = 174.7 C.S. = 1.3664 C.K. = 5.6428
SAMPLE STATISTICS (LOGS)
MEAN = 5.9807 S.D. = .3845 C.S. = .1607 C.K. = 3.2774
SAMPLE MIN = 171. SAMPLE MAX = 1011. N = 54

PARAMETERS FOR GUMBEL I A = .007893 U = 351.
PARAMETERS FOR LOGNORMAL M = 5.9807 S = .3845
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 50. M = 5.8322 S = .4449
STATISTICS OF LOG(X-A)
MEAN = 5.8322 S.D. = .4449 C.S. = -.0131 C.K. = 3.2621
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0309 B = .1549E+03 LOG(M) = 1.1961
ME= .3307E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0315 B = .1462E+03
LOG(P)F= 1.3736 M = .3950E+01
DISTRIBUTION STATISTICS MEAN = 5.9807 S.D. = .3810 C.S. = .1654

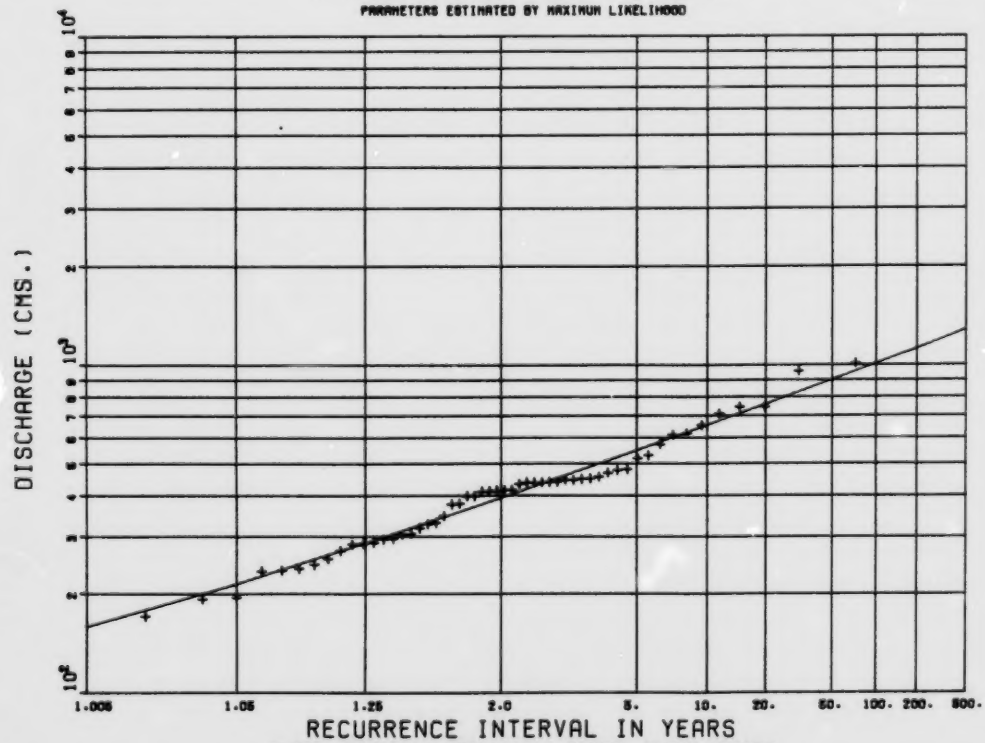
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	139.		147.		153.		157.		156.	
1.050	209.		210.		214.		215.		214.	
1.250	290.		286.		285.		286.		285.	
2.000	397.		396.		391.		392.		392.	
2.330	424.	5.15	424.	5.27	419.	5.65	419.	5.64	419.	5.71
5.000	541.	5.75	547.	6.09	546.	6.40	543.	6.33	545.	6.38
10.000	636.	6.27	648.	7.06	654.	7.76	649.	7.65	652.	7.72
20.000	727.	6.71	745.	8.03	759.	9.44	753.	9.53	758.	9.64
50.000	845.	7.19	872.	9.23	901.	11.90	895.	12.50	901.	12.70
100.000	933.	7.47	968.	10.10	1010.	13.70	1010.	15.10	1011.	15.40
200.000	1020.	7.71	1070.	10.90	1120.	15.60	1120.	17.80	1132.	18.10
500.000	1140.	7.99	1200.	11.90	1260.	18.00	1260.	21.50	1291.	22.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

ENGLISH RIVER AT EAR FALLS (1929-82) 05QE006

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I103.0

ENGLISH RIVER AT EAR FALLS (1907-28) 05QE006

DRAINAGE AREA : 26400.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1907 - 1928

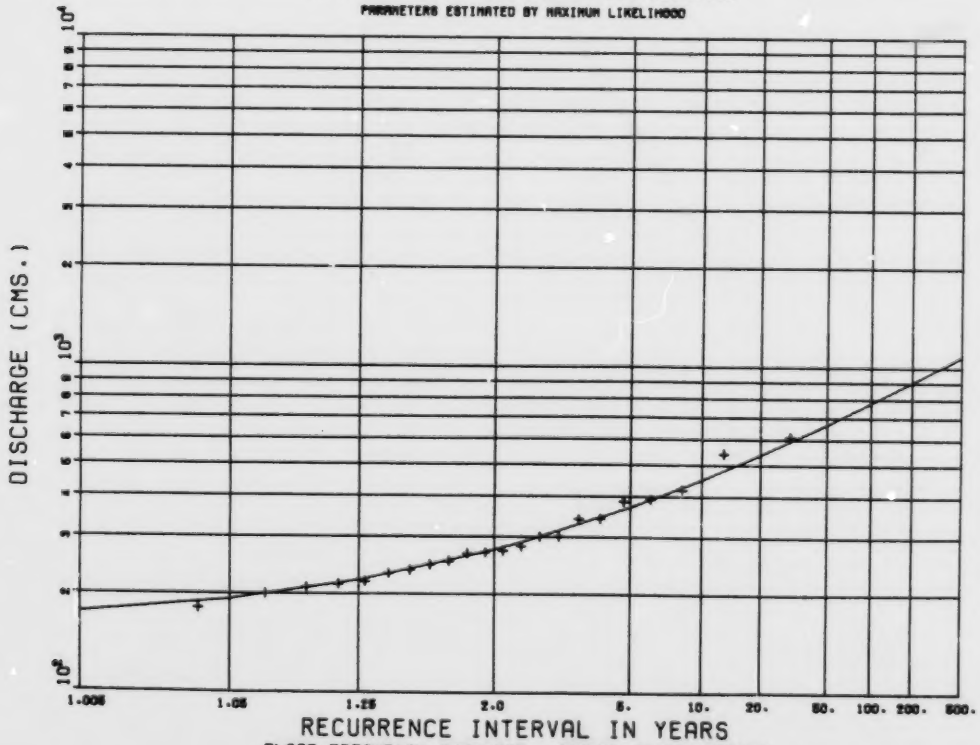
SAMPLE STATISTICS
MEAN = 309. S.D. = 109.7 C.S. = 1.5283 C.K. = 5.6826
SAMPLE STATISTICS (LOGS)
MEAN = 5.6681 S.D. = .3171 C.S. = .8385 C.K. = 3.7805
SAMPLE MIN = 181. SAMPLE MAX = 612. N = 22

PARAMETERS FOR GUMBEL I A = .014258 U = 260.
PARAMETERS FOR LOGNORMAL M = 5.6681 S = .3171
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 157. M = 4.7565 S = .7209
STATISTICS OF LOG(X-A)
MEAN = 4.7565 S.D. = .7209 C.S. = -.0756 C.K. = 3.4111
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1330 B = .5685E+01 LOG(M) = 4.9116
ME= .1359E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1826 B = .3050E+01
LOG(M)F= 5.1111 M = .1659E+03
DISTRIBUTION STATISTICS MEAN = 5.6681 S.D. = .3189 C.S. = 1.1451

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	143.		128.		175.		176.		163.	
1.050	182.		172.		192.		193.		187.	
1.250	226.		222.		220.		221.		221.	
2.000	285.		289.		273.		273.		277.	
2.330	300.	5.32	306.	6.81	283.	7.33	288.	6.94	293.	7.97
5.000	365.	7.39	378.	7.87	373.	10.30	366.	10.00	378.	9.60
10.000	417.	8.28	435.	9.13	450.	13.90	443.	13.60	442.	12.70
20.000	468.	9.04	488.	10.40	539.	17.90	530.	17.60	520.	17.40
50.000	533.	9.85	555.	11.90	668.	23.40	664.	23.30	634.	25.10
100.000	582.	10.40	605.	13.30	779.	27.50	784.	27.90	731.	31.60
200.000	631.	10.90	655.	14.00	902.	31.50	923.	32.60	840.	38.60
500.000	695.	11.30	722.	15.30	1080.	36.70	1140.	39.10	1000.	48.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ENGLISH RIVER AT EAR FALLS (1907-28) 05QE006
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I103.1

ENGLISH RIVER AT MANITOU FALLS 05QE007

DRAINAGE AREA : 27000.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1957 - 1982

SAMPLE STATISTICS
MEAN = 593. S.D. = 129.4 C.S. = 1.0161 C.K. = 3.8597
SAMPLE STATISTICS (LOGS)
MEAN = 6.3645 S.D. = .2056 C.S. = .6084 C.K. = 3.2207
SAMPLE MIN = 421. SAMPLE MAX = 910. N = 26

PARAMETERS FOR GUMBEL I A = .010661 U = 536.
PARAMETERS FOR LOGNORMAL M = 6.3645 S = .2056
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 341. M = 5.4074 S = .5101
STATISTICS OF LOG(X-A)
MEAN = 5.4074 S.D. = .5101 C.S. = -.0731 C.K. = 3.1555
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8625 B = .1081E+02 LOG(M) = 5.6886
ME= .2955E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0927 B = .4[illegible]4E+01
LOG(M)= 5.9061 M = .3673E+03
DISTRIBUTION STATISTICS MEAN = 6.3645 S.D. = .2062 C.S. = .8994

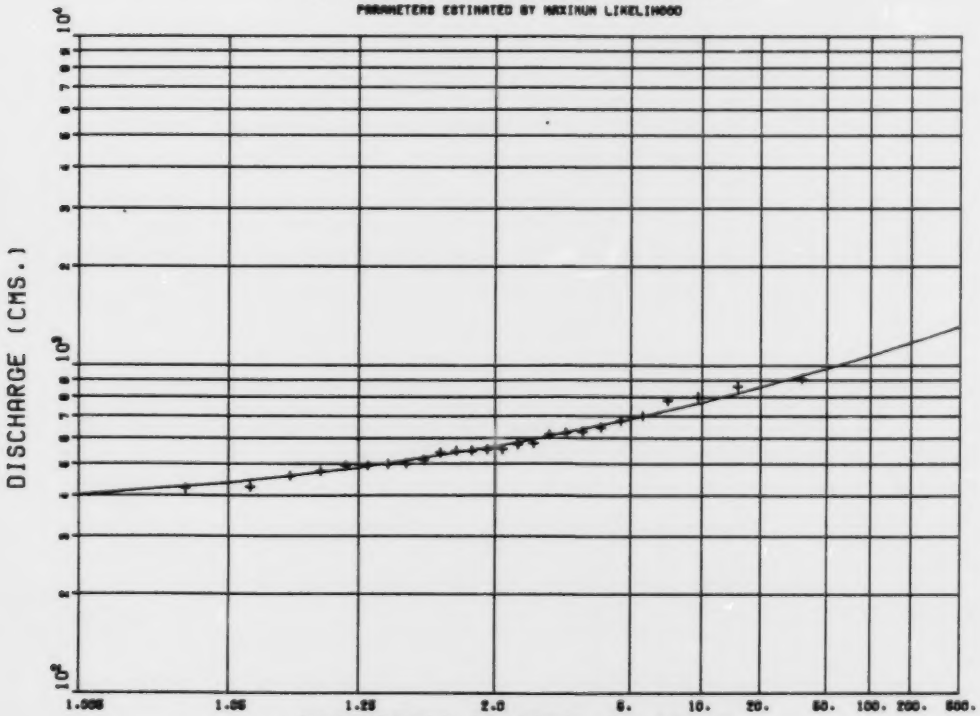
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	380.		342.		401.		404.		384.	
1.050	432.		414.		437.		439.		431.	
1.250	492.		489.		486.		487.		487.	
2.000	571.		581.		564.		564.		569.	
2.330	591.	3.95	603.	4.06	585.	4.41	584.	4.25	590.	4.59
5.000	677.	4.90	691.	4.69	684.	5.83	680.	5.74	684.	5.45
10.000	747.	5.69	756.	5.44	770.	7.74	765.	7.62	763.	7.05
20.000	815.	6.38	815.	6.19	857.	10.00	851.	9.83	841.	9.35
50.000	902.	7.17	896.	7.11	977.	13.40	972.	13.10	945.	13.10
100.000	968.	7.68	937.	7.76	1070.	16.00	1070.	15.70	1030.	16.20
200.000	1030.	8.14	986.	8.38	1170.	18.70	1170.	18.40	1110.	19.50
500.000	1120.	8.66	1050.	9.15	1310.	22.30	1320.	22.20	1230.	24.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ENGLISH RIVER AT MANITOU FALLS 05QE007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 7104.0

ENGLISH RIVER AT UMFREVILLE 05QA002

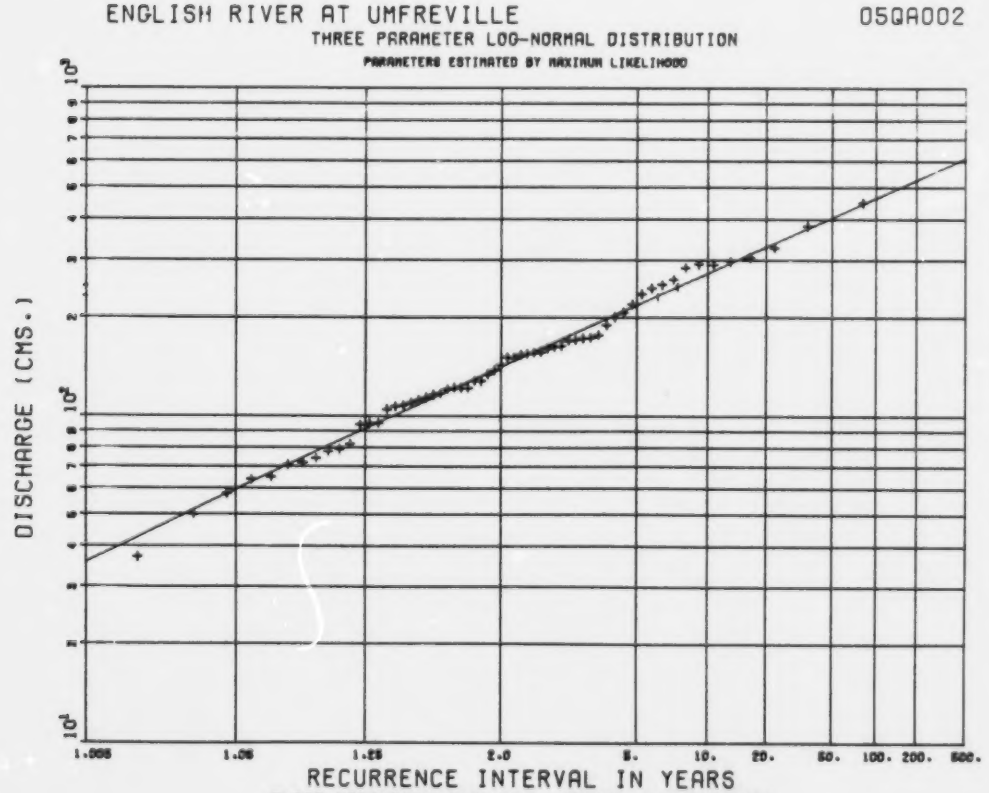
DRAINAGE AREA = 6230.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1922 - 1982

SAMPLE STATISTICS
MEAN = 160. S.D. = 84.7 C.S. = 1.2148 C.K. = 4.6679
SAMPLE STATISTICS (LOGS)
MEAN = 4.9471 S.D. = .5187 C.S. = -.0921 C.K. = 3.0535
SAMPLE MIN = 37. SAMPLE MAX = 449. N = 61

PARAMETERS FOR GUMBEL I A = .016454 U = 123.
PARAMETERS FOR LOGNORMAL M = 4.9471 S = .5187
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -5. M = 4.9864 S = .4986
STATISTICS OF LOG(X-A)
MEAN = 4.9864 S.D. = .4986 C.S. = -.0363 C.K. = 3.0033
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0239 B = .4718E+03 LOG(M) =16.2142
ME= .1101E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0278 B = .3437E+03
LOG(M)F=14.4867 M = .1957E+07
DISTRIBUTION STATISTICS MEAN = 4.9471 S.D. = .5146 C.S. = -.1079

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	22.		37.		36.		36.		35.	
1.050	56.		60.		60.		60.		59.	
1.250	94.		91.		91.		92.		91.	
2.000	146.		141.		141.		142.		142.	
5.000	198.	6.23	194.	6.69	195.	6.67	196.	7.09	196.	7.17
10.000	234.	6.54	230.	7.73	230.	7.60	230.	7.48	230.	7.58
20.000	268.	6.92	274.	8.96	272.	9.03	271.	8.62	272.	8.76
50.000	314.	7.24	330.	10.20	326.	10.80	323.	10.40	326.	10.60
100.000	350.	7.59	409.	11.70	403.	13.30	393.	11.50	398.	13.80
100.000	403.	7.81	478.	12.80	462.	15.20	447.	16.10	454.	16.50
200.000	445.	7.99	536.	13.80	524.	17.10	503.	19.00	512.	19.40
500.000	501.	8.19	627.	15.10	611.	19.50	579.	22.90	592.	23.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I105.0

ENGLISH RIVER NEAR SIOUX LOOKOUT 05QA001

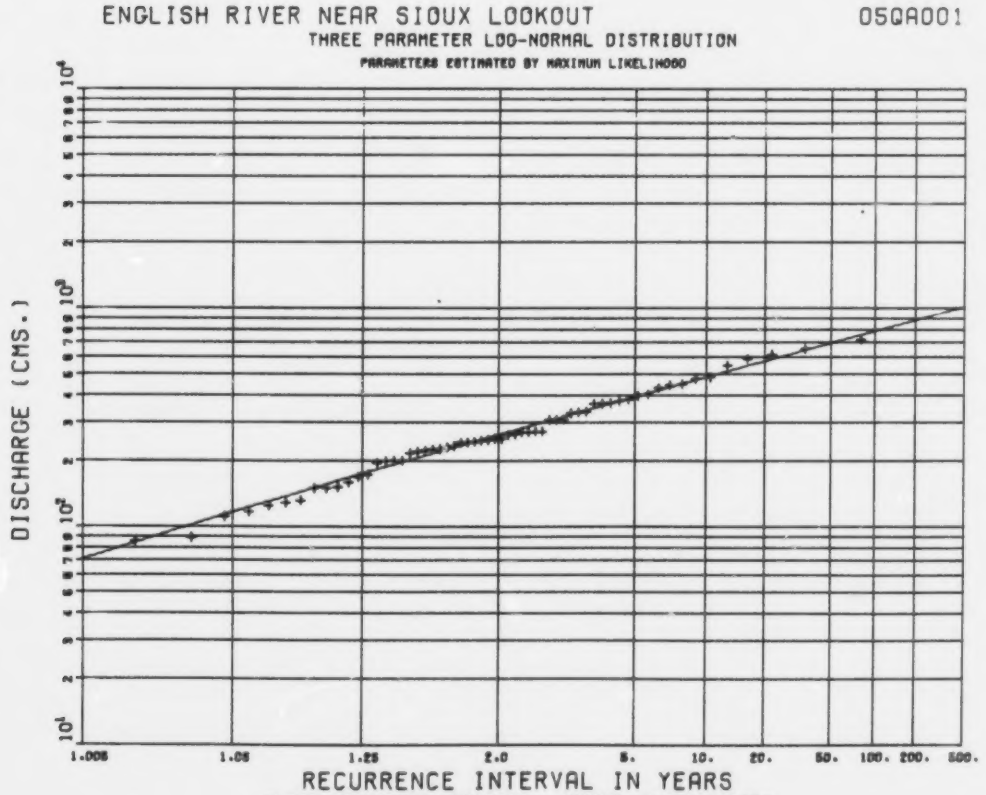
DRAINAGE AREA = 13900.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1922 - 1981

SAMPLE STATISTICS
MEAN = 291. S.D. = 141.8 C.S. = 1.0475 C.K. = 4.0776
SAMPLE STATISTICS (LOGS)
MEAN = 5.5617 S.D. = .4854 C.S. = -.1385 C.K. = 2.9323
SAMPLE MIN = 86. SAMPLE MAX = 719. N = 60

PARAMETERS FOR GUMBEL I A = .879466 U = 228.
PARAMETERS FOR LOGNORMAL M = 5.5617 S = .4854
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -15. M = 5.6240 S = .4559
STATISTICS OF LOG(X-A)
MEAN = 5.6240 S.D. = .4559 C.S. = -.0564 C.K. = 2.8886
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0217 B = .2349E+03 LOG(M) =13.0013
ME= .4430E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0407 B = .1402E+03
LOG(M)F=11.2653 M = .7807E+05
DISTRIBUTION STATISTICS MEAN = 5.5617 S.D. = .4817 C.S. = -.1609

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	52.		75.		71.		70.		70.	
1.050	111.		117.		116.		115.		115.	
1.250	178.		173.		174.		174.		174.	
2.000	267.		260.		262.		264.		263.	
5.330	289.	5.98	284.	6.32	285.	6.57	287.	6.67	287.	6.75
5.000	387.	6.35	392.	7.29	392.	7.11	392.	6.94	393.	7.08
10.000	466.	6.76	485.	8.46	482.	8.43	478.	7.90	481.	8.12
20.000	542.	7.12	578.	9.61	571.	10.10	561.	9.47	568.	9.82
50.000	641.	7.49	705.	11.10	692.	12.20	670.	12.20	682.	12.70
100.000	714.	7.72	805.	12.10	785.	14.30	752.	14.60	768.	15.30
200.000	788.	7.91	909.	13.00	881.	16.10	834.	17.10	856.	17.90
500.000	885.	8.12	1050.	14.20	1010.	18.40	945.	20.60	976.	21.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1106.0 I

ERAMOSA RIVER ABOVE GUELPH 02GA029

DRAINAGE AREA : 236.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1966 - 1982

SAMPLE STATISTICS MEAN = 31. S.D. = 12.1 C.S. = -.1911 C.K. = 2.2536
SAMPLE STATISTICS (LOGS) MEAN = 3.3558 S.D. = .4499 C.S. = -.6943 C.K. = 3.0544
SAMPLE MIN = 11. SAMPLE MAX = 48. N = 17

PARAMETERS FOR GUMBEL I A = .091522 U = 25.
PARAMETERS FOR LOGNORMAL M = 3.3558 S = .4499

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1562 B = .8297E+01 LOG(M) = 4.6519
ME= .1048E+03

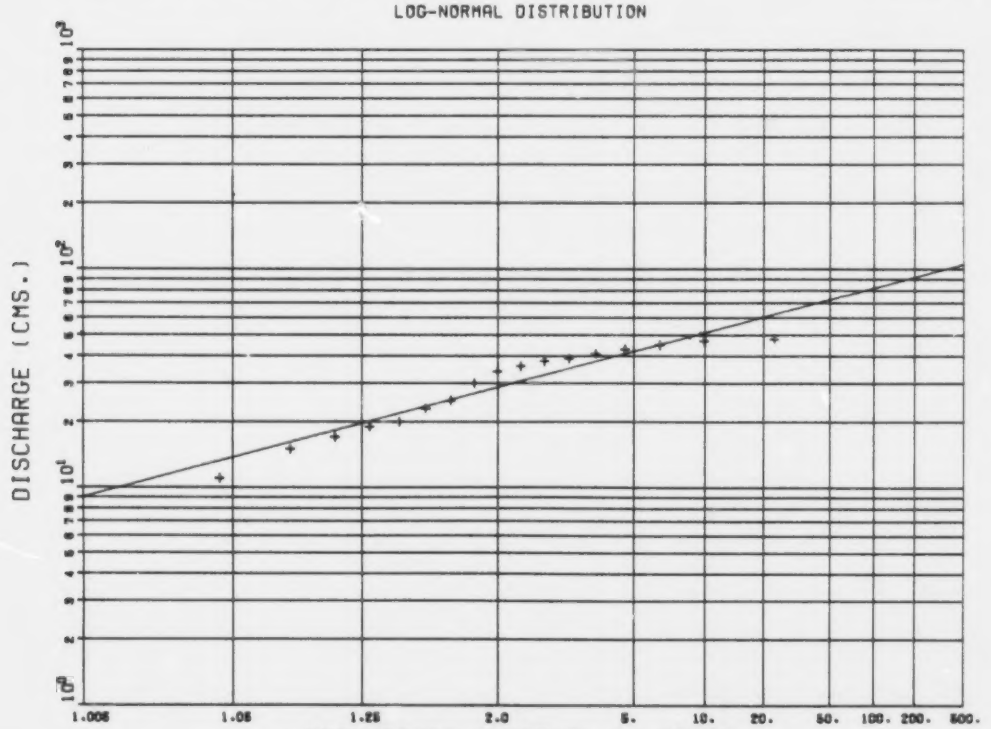
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	7.		9.		0.		0.		7.	
1.050	13.		14.		0.		0.		13.	
1.250	20.		20.		0.		0.		20.	
2.000	29.		29.		0.		0.		30.	
5.000	42.	10.60	42.	12.70	0.	0.00	0.	0.00	42.	10.30
10.000	50.	12.30	51.	14.70	0.	0.00	0.	0.00	49.	10.80
20.000	58.	13.00	60.	16.70	0.	0.00	0.	0.00	55.	13.40
50.000	68.	13.70	72.	19.20	0.	0.00	0.	0.00	61.	18.70
100.000	76.	14.20	82.	21.00	0.	0.00	0.	0.00	65.	23.20
200.000	83.	14.60	91.	22.70	0.	0.00	0.	0.00	69.	27.90
500.000	93.	15.00	105.	24.80	0.	0.00	0.	0.00	73.	34.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

ERAMOSA RIVER ABOVE GUELPH 02GA029

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I107.0

ETOBICOKE CREEK AT BRAMPTON 02HC017

DRAINAGE AREA = 63.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	31.	11.	.789	4.016
LN X SERIES	3.35	.41	-.915	5.987

X(MIN)= 10. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 53. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

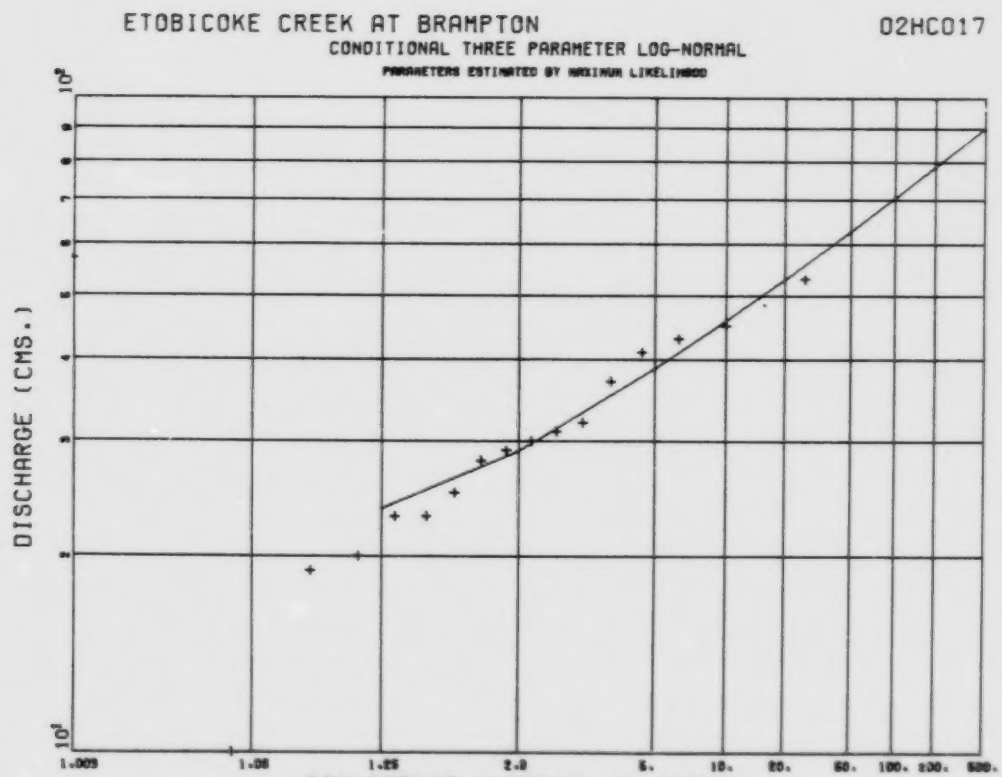
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	32.	10.	.674	3.870
LN X SERIES	3.42	.31	.170	3.267
LN (X-A) SERIES	2.89	.52	-.177	3.348

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 11.7660 M = 2.8851 S = .5160

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	24.
2.000	.500	29.
2.330	.429	31.
5.000	.200	39.
10.000	.100	46.
20.000	.050	53.
50.000	.020	63.
100.000	.010	71.
200.000	.005	79.
500.000	.002	90.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE (I108.0)

ETOBICOKE CREEK BELOW QUEEN ELIZABETH HIGHWAY 02HC030

DRAINAGE AREA = 204.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

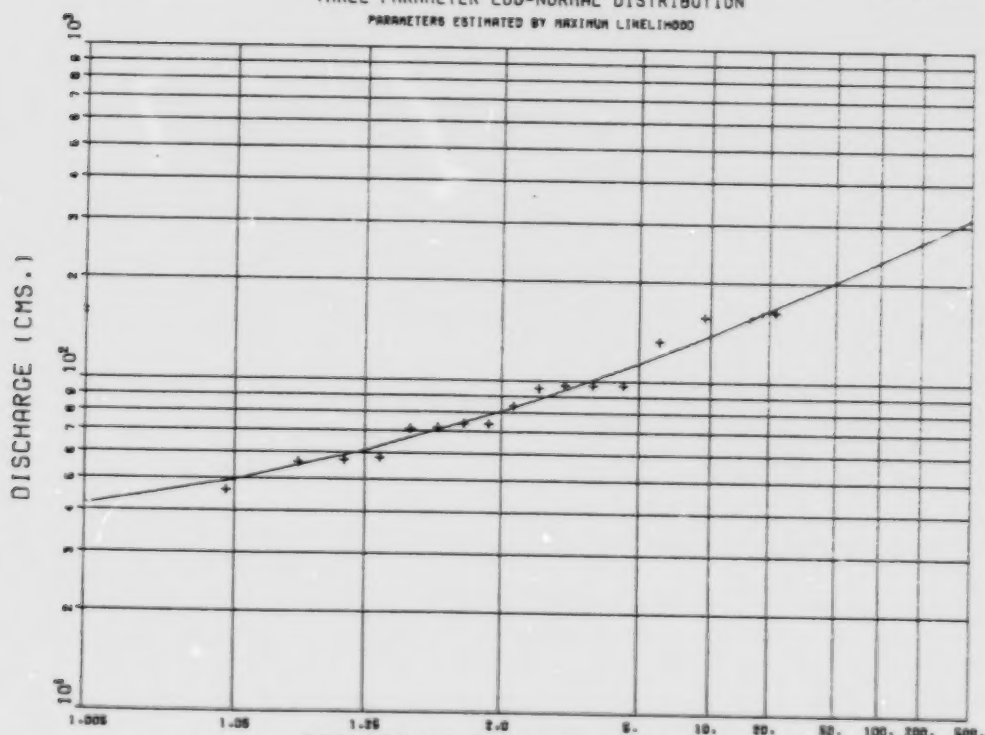
SAMPLE STATISTICS
MEAN = 49. S.D. = 34.8 C.S. = 1.0555 C.K = 4.1196
SAMPLE STATISTICS (LOGS)
MEAN = 4.4279 S.D. = .3661 C.S. = .3881 C.K. = 3.2936
SAMPLE MIN = 46. SAMPLE MAX = 163. N = 16

PARAMETERS FOR GUMBEL I A = .340919 U = 74.
PARAMETERS FOR LOGNORMAL M = 4.4279 S = .3661
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 31. M = 3.8957 S = .6072
STATISTICS OF LOG(X-A)
MEAN = 3.8957 S.D. = .6072 C.S. = -.1233 C.K. = 3.4209
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0711 B = .2655E+02 LOG(M) = 2.5413
ME= .1270E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1241 B = .8474E+01
LOG(M)= 3.3764 M = .2927E+02
DISTRIBUTION STATISTICS MEAN = 4.4279 S.D. = .3612 C.S. = .6870

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	34.		33.		42.		42.		37.	
1.050	47.		46.		49.		50.		44.	
1.250	63.		62.		61.		62.		61.	
2.000	83.		84.		81.		80.		82.	
5.000	96.	8.76	99.	9.23	96.	12.20	96.	9.67	97.	10.20
10.000	111.	9.92	114.	10.70	113.	12.60	111.	12.30	113.	11.80
20.000	129.	10.90	134.	12.40	138.	16.30	135.	16.00	136.	14.60
50.000	147.	11.80	153.	14.00	165.	20.40	151.	20.60	159.	19.00
100.000	170.	12.70	178.	16.10	202.	26.00	166.	27.40	181.	25.20
200.000	187.	13.20	196.	17.60	239.	30.20	232.	32.90	218.	31.50
500.000	204.	13.70	215.	19.00	286.	34.40	268.	38.70	246.	37.60
	226.	14.20	240.	20.80	314.	39.70	323.	46.70	287.	45.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ETOBICOKE CREEK BELOW QUEEN ELIZABETH HIGHWAY 02HC030
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I109.0

ETOBICOKE CREEK NEAR SUMMERVILLE 02HC002

DRAINAGE AREA 166.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1946 - 1981

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	140.	71.	-.066	2.908
LN X SERIES	4.77	.69	-1.130	4.936

X(MIN)= 22. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 252. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	148.	66.	-.036	2.399
LN X SERIES	4.88	.54	-.779	3.725
LN (X-A) SERIES	7.51	.04	-.015	2.995

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1977.7878 M = 7.5113 S = .0363

FLOOD FREQUENCY REGIME

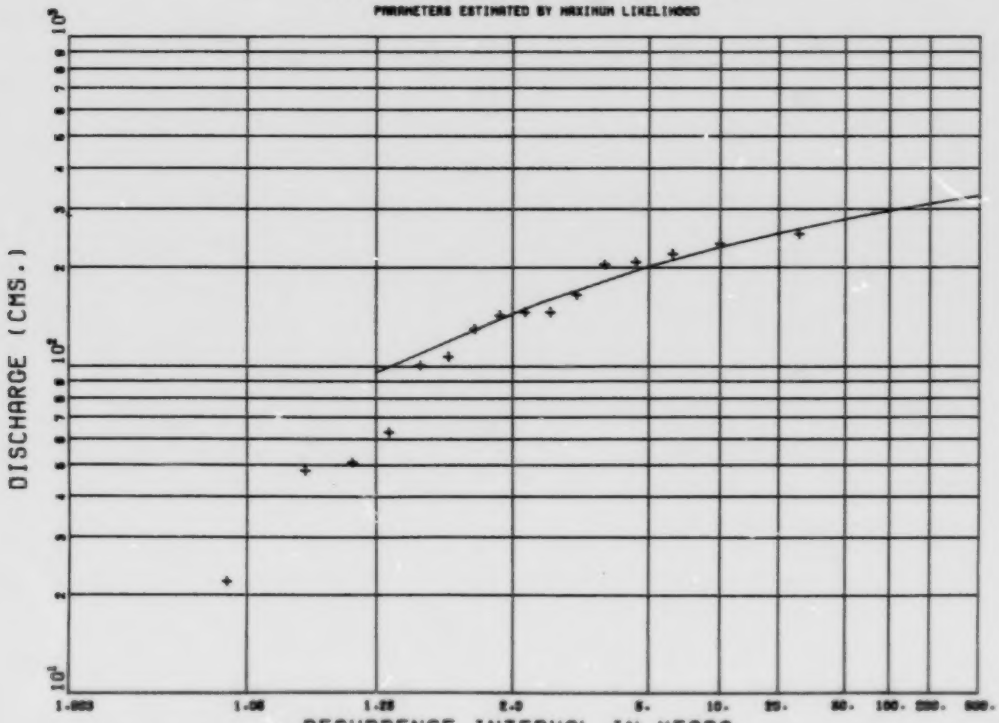
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	96.
2.000	.500	144.
2.330	.429	156.
5.000	.200	201.
10.000	.100	230.
20.000	.050	253.
50.000	.020	279.
100.000	.010	296.
200.000	.005	311.
500.000	.002	329.

ETOBICOKE CREEK NEAR SUMMERVILLE 02HC002

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I110.0

FAIRCHILD CREEK NEAR BRANTFORD 02GB007

DRAINAGE AREA : 360.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1965 - 1982

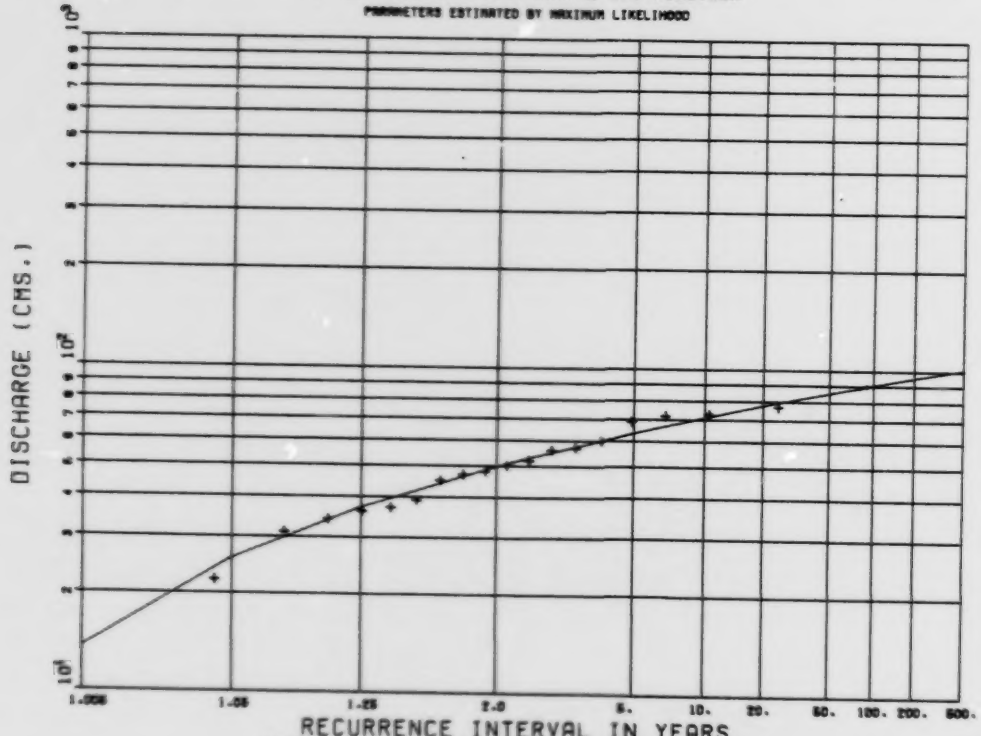
SAMPLE STATISTICS
MEAN = 50. S.D. = 15.7 C.S. = .1368 C.K. = 2.8238
SAMPLE STATISTICS (LOGS)
MEAN = 3.8671 S.D. = .3363 C.S. = -.5436 C.K. = 3.6572
SAMPLE MIN = 22. SAMPLE MAX = 77. N = 18

PARAMETERS FOR GUMBEL I A = .072063 U = 43.
PARAMETERS FOR LOGNORMAL M = 3.8671 S = .3363
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -121. M = 5.1412 S = .0919
STATISTICS OF LOG(X-A)
MEAN = 5.1412 S.D. = .0919 C.S. = -.0273 C.K. = 2.8966
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8914 B = .1354E+02 LOG(M) = 5.1046
ME= .1648E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2632 B = .2819E+01
LOG(M)F= 4.3985 M = .8133E+02
DISTRIBUTION STATISTICS MEAN = 3.8671 S.D. = .3740 C.S. =-1.4075

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	20.		28.		14.		11.		17.	
1.050	27.		28.		26.		23.		26.	
1.250	36.		36.		37.		37.		37.	
2.000	48.		48.		50.		52.		49.	
2.330	51.	8.17	51.	7.99	53.	7.75	55.	0.00	52.	8.53
5.000	64.	9.27	64.	9.23	63.	7.37	65.	0.00	64.	7.87
10.000	74.	10.20	74.	10.70	71.	8.09	71.	0.00	72.	8.48
20.000	84.	11.00	83.	12.20	78.	9.37	74.	0.00	79.	10.20
50.000	97.	11.90	96.	14.00	85.	11.40	77.	0.00	86.	13.70
100.000	107.	12.40	105.	15.30	90.	13.10	79.	0.00	91.	16.70
200.000	116.	12.90	114.	16.50	95.	14.80	80.	0.00	96.	20.00
500.000	129.	13.40	126.	18.00	101.	17.10	81.	0.00	102.	24.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

FAIRCHILD CREEK NEAR BRANTFORD 02GB007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II11.0

FARR CREEK AT NORTH COBALT 02JE018

DRAINAGE AREA : 62.9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1973 - 1982

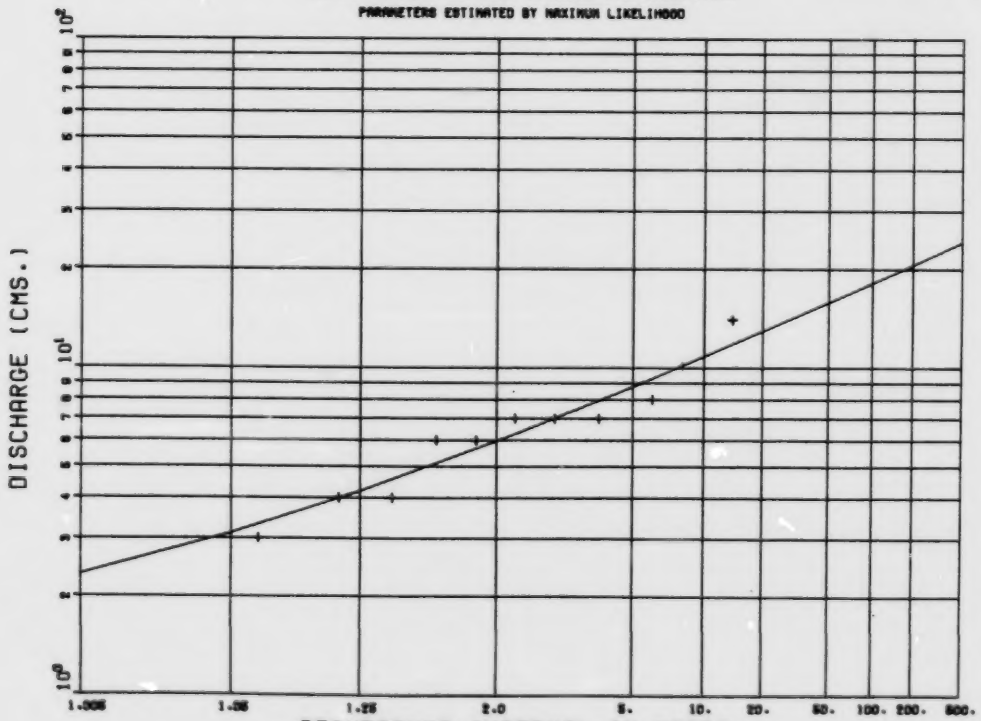
SAMPLE STATISTICS
MEAN = 7. S.D. = 3.1 C.S. = 1.5763 C.K. = 8.0960
SAMPLE STATISTICS (LOGS)
MEAN = 1.8011 S.D. = .4321 C.S. = .2232 C.K. = 5.0284
SAMPLE MIN = 3. SAMPLE MAX = 14. N = 10

PARAMETERS FOR GUMBEL I A = .480151 U = 5.
PARAMETERS FOR LOGNORMAL M = 1.8011 S = .4321
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 1.5610 S = .5462
STATISTICS OF LOG(X-A)
MEAN = 1.5610 S.D. = .5462 C.S. = -.0957 C.K. = 4.8061
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0482 B = .8026E+02 LOG(M) =-2.0699
ME= .1262E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0493 B = .6923E+02
LOG(M)F=-1.6136 M = .1992E+00
DISTRIBUTION STATISTICS MEAN = 1.8011 S.D. = .4104 C.S. = .2404

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	2.		2.		2.		2.		2.	
1.050	3.		3.		3.		3.		3.	
1.250	4.		4.		4.		4.		4.	
2.000	6.		6.		6.		6.		6.	
2.330	7.	12.80	7.	13.80	6.	14.90	6.	14.10	6.	15.00
5.000	8.	14.90	9.	15.90	9.	17.40	9.	16.10	9.	16.90
10.000	10.	15.20	11.	18.40	11.	21.40	10.	19.70	11.	20.70
20.000	12.	16.20	12.	21.00	13.	26.10	12.	24.70	13.	26.00
50.000	14.	17.20	15.	24.10	16.	32.70	15.	32.70	16.	34.70
100.000	15.	17.80	17.	26.30	18.	37.60	17.	39.30	18.	41.90
200.000	16.	18.40	18.	28.60	21.	42.50	19.	46.30	20.	49.60
500.000	18.	19.00	21.	31.00	24.	48.90	22.	56.00	24.	60.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

FARR CREEK AT NORTH COBALT 02JE018
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II12.0)

FAWN RIVER BELOW BIG TROUT LAKE 04CE002

DRAINAGE AREA : 4350.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

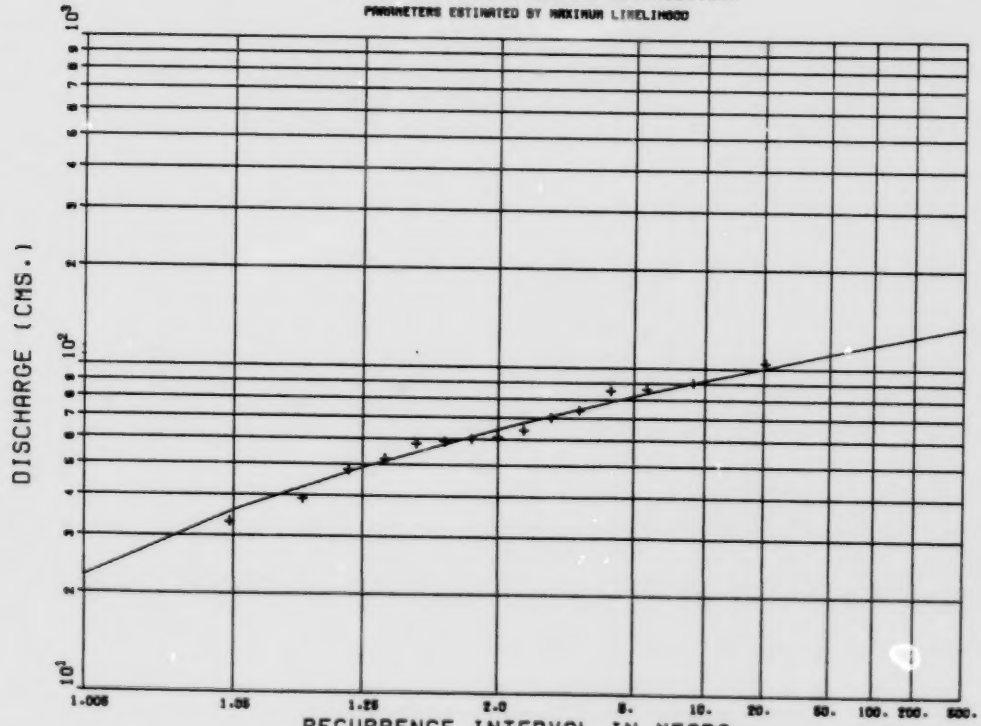
SAMPLE STATISTICS
MEAN = 66. S.D. = 19.6 C.S. = .2878 C.K. = 3.4480
SAMPLE STATISTICS (LOGS)
MEAN = 4.1386 S.D. = .3134 C.S. = -.4183 C.K. = 3.7472
SAMPLE MIN = 33. SAMPLE MAX = 104. N = 15

PARAMETERS FOR GUMBEL I A = .059226 U = 56.
PARAMETERS FOR LOGNORMAL M = 4.1386 S = .3134
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -69. M = 4.8904 S = .1460
STATISTICS OF LOG(X-A)
MEAN = 4.8904 S.D. = .1460 C.S. = -.0322 C.K. = 3.4210
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0656 B = .2286E+02 LOG(M) = 5.6373
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .2807E+03
A = -.1003 B = .9412E+01
LOG(M)F= 5.8824 M = .1612E+03
DISTRIBUTION STATISTICS MEAN = 4.1386 S.D. = .3077 C.S. = -.6519

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	28.		28.		23.		24.		25.	
1.050	38.		37.		36.		36.		36.	
1.250	48.		48.		49.		49.		49.	
2.000	63.		63.		64.		65.		64.	
2.330	66.	8.37	66.	8.16	68.	8.19	68.	8.02	68.	8.63
5.000	82.	9.62	82.	9.42	82.	8.10	82.	7.56	82.	8.38
10.000	94.	10.70	94.	10.90	92.	9.11	91.	7.71	92.	9.12
20.000	106.	11.60	105.	12.40	100.	10.70	98.	8.42	101.	10.90
50.000	122.	12.50	119.	14.30	111.	13.20	106.	10.10	111.	14.40
100.000	134.	13.20	130.	15.60	118.	15.20	111.	11.60	118.	17.40
200.000	146.	13.70	141.	16.80	125.	17.30	115.	13.40	124.	20.70
500.000	161.	14.20	155.	18.40	134.	20.00	121.	15.90	132.	25.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

FAWN RIVER BELOW BIG TROUT LAKE 04CE002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II13.0
I-117

FISH CREEK NEAR PROSPECT HILL 02GD010

DRAINAGE AREA 150.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1946 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	62.	32.	1.158	4.917
LN X SERIES	3.99	.57	-.979	6.224

X(MIN)= 8. CMS. TOTAL SAMPLE SIZE= 37
X(MAX)= 150. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	63.	31.	1.304	5.062
LN X SERIES	4.04	.47	-.101	3.923
LN (X-A) SERIES	4.12	.43	.032	3.801

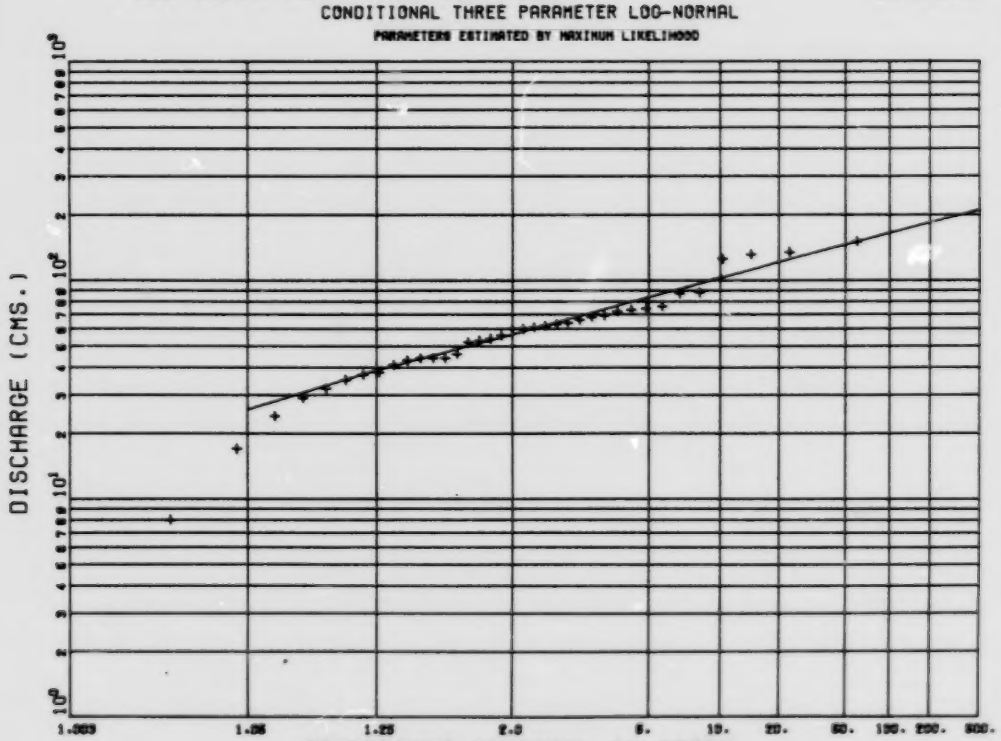
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -4.4322 M = 4.1289 S = .4335

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	26.
1.250	.800	39.
2.000	.500	56.
2.330	.429	61.
5.000	.200	83.
10.000	.100	102.
20.000	.050	121.
50.000	.020	145.
100.000	.010	164.
200.000	.005	183.
500.000	.002	209.

FISH CREEK NEAR PROSPECT HILL 02GD010
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1114.0

FREDERICK HOUSE R. AT FREDERICK HOUSE LAKE DAM 04MD002

DRAINAGE AREA : 2870.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1939 - 1982

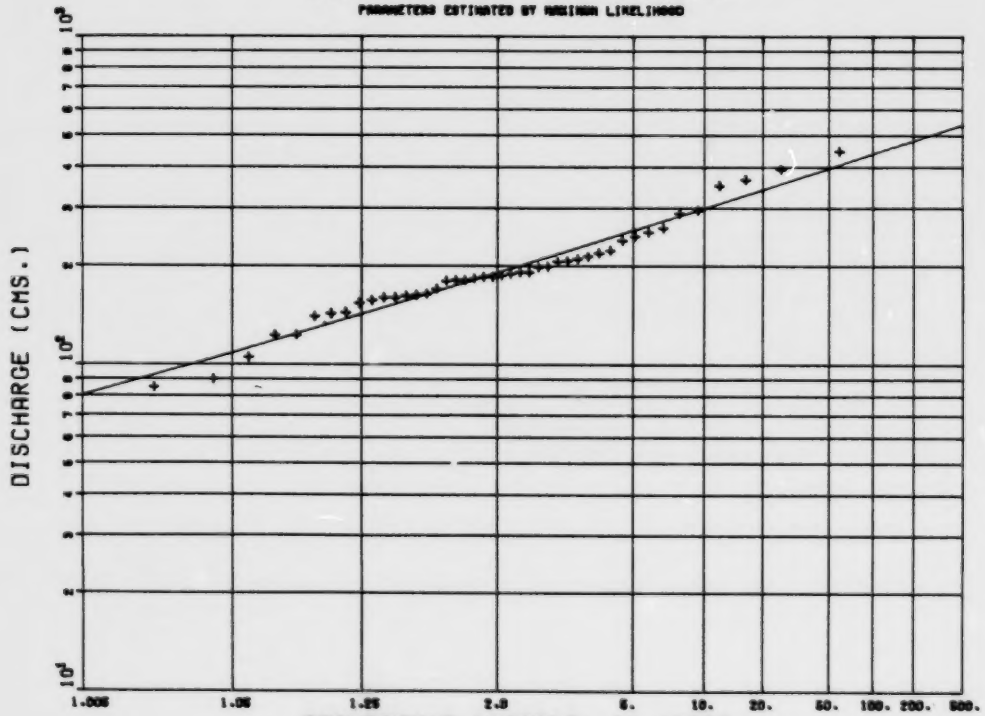
SAMPLE STATISTICS
MEAN = 203. S.D. = 75.9 C.S. = 1.3844 C.K. = 5.5106
SAMPLE STATISTICS (LOGS)
MEAN = 5.2501 S.D. = .3495 C.S. = .1788 C.K. = 3.9257
SAMPLE MIN = 85. SAMPLE MAX = 447. N = 44

PARAMETERS FOR GUMBEL I A = .018067 U = 170.
PARAMETERS FOR LOGNORMAL M = 5.2501 S = .3495
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 14. M = 5.1707 S = .3780
STATISTICS OF LOG(X-A)
MEAN = 5.1707 S.D. = .3780 C.S. = .0691 C.K. = 3.9584
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0312 B = .1251E+03 LOG(M) = 1.3408
ME= .3822E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0216 B = .2553E+03
LOG(M)F= -.2673 M = .7655E+00
DISTRIBUTION STATISTICS MEAN = 5.2501 S.D. = .3452 C.S. = .1252

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	78.		78.		83.		81.		82.	
1.050	108.		107.		108.		109.		109.	
1.250	144.		142.		142.		142.		142.	
2.000	190.		191.		190.		189.		189.	
2.330	202.	5.24	203.	5.31	202.	5.66	201.	5.66	201.	5.76
5.000	253.	5.94	256.	6.13	256.	6.28	254.	6.29	255.	6.45
10.000	295.	6.55	298.	7.11	299.	7.55	298.	7.56	300.	7.83
20.000	334.	7.06	339.	8.04	341.	9.17	340.	9.38	345.	9.00
50.000	386.	7.60	391.	9.29	396.	11.50	396.	12.30	404.	11.00
100.000	425.	7.94	430.	10.10	438.	13.40	439.	14.80	450.	13.70
200.000	463.	8.23	469.	10.90	480.	15.20	483.	17.40	497.	16.50
500.000	514.	8.56	521.	12.00	537.	17.60	543.	21.10	563.	22.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

FREDERICK HOUSE R. AT FREDERICK HOUSE LAKE DAM 04MD002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I115

FRENCH RIVER AT DRY PINE BAY 02DD010

DRAINAGE AREA : 13900.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1962 - 1982

SAMPLE STATISTICS
MEAN = 306. S.D. = 52.9 C.S. = .6638 C.K. = 4.9335
SAMPLE STATISTICS (LOGS)
MEAN = 5.9466 S.D. = .1351 C.S. = .1490 C.K. = 4.4158
SAMPLE MIN = 203. SAMPLE MAX = 526. N = 21

PARAMETERS FOR GUMBEL I A = .021702 U = 361.
PARAMETERS FOR LOGNORMAL M = 5.9466 S = .1351
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 73. M = 5.7310 S = .1675
STATISTICS OF LOG(X-A)
MEAN = 5.7310 S.D. = .1675 C.S. = .0255 C.K. = 4.4164
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0101 B = .1802E+03 LOG(P) = 4.1330
ME= .6236E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0069 B = .3624E+03
LOG(P)F= 3.4373 M = .3110E+02
DISTRIBUTION STATISTICS MEAN = 5.9466 S.D. = .1318 C.S. = .1051

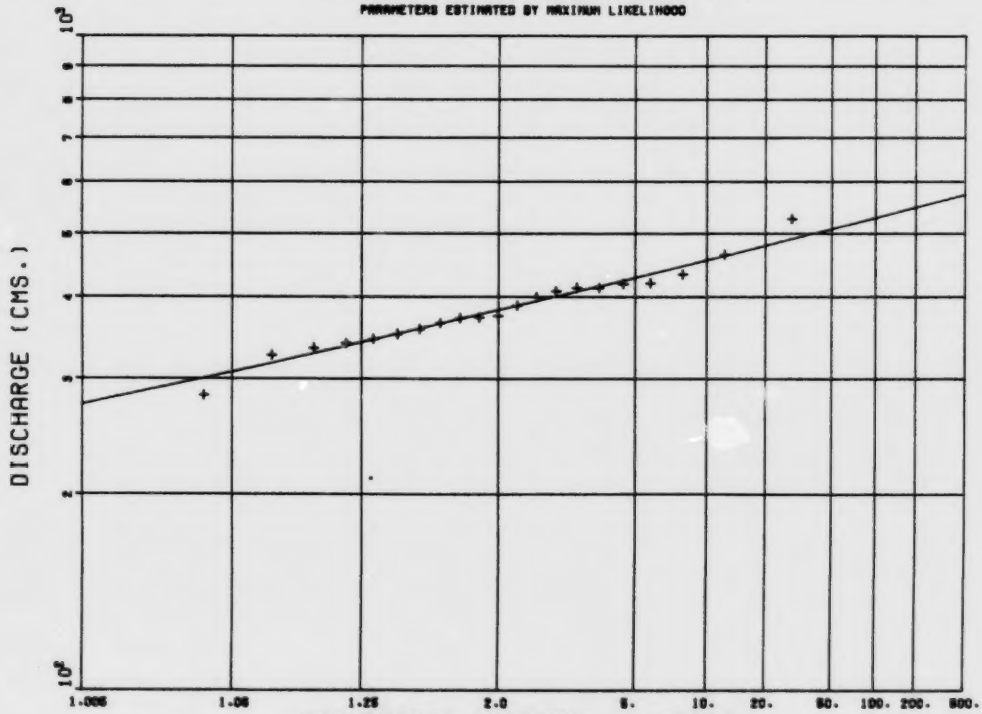
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	284.		270.		274.		276.		275.	
1.050	310.		306.		307.		309.		308.	
1.250	339.		341.		341.		342.		341.	
2.000	378.		382.		382.		382.		381.	
2.330	388.	3.29	392.	2.97	391.	3.20	391.	3.13	390.	3.22
5.000	430.	4.21	429.	3.43	428.	3.53	427.	3.46	428.	3.58
10.000	465.	5.00	455.	3.98	455.	4.24	454.	4.14	456.	4.33
20.000	498.	5.71	478.	4.52	479.	5.22	477.	5.13	480.	5.40
50.000	541.	6.54	505.	5.20	508.	6.75	505.	6.73	510.	7.13
100.000	573.	7.09	524.	5.68	528.	8.00	525.	8.09	531.	8.59
200.000	605.	7.59	542.	6.13	548.	9.31	544.	9.52	552.	10.10
500.000	648.	8.18	564.	6.69	573.	11.18	569.	11.50	578.	12.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

FRENCH RIVER AT DRY PINE BAY 02DD010

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I116.0

FRENCH RIVER AT FRENCH RIVER 02DD004

DRAINAGE AREA : 13900.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1931 - 1962

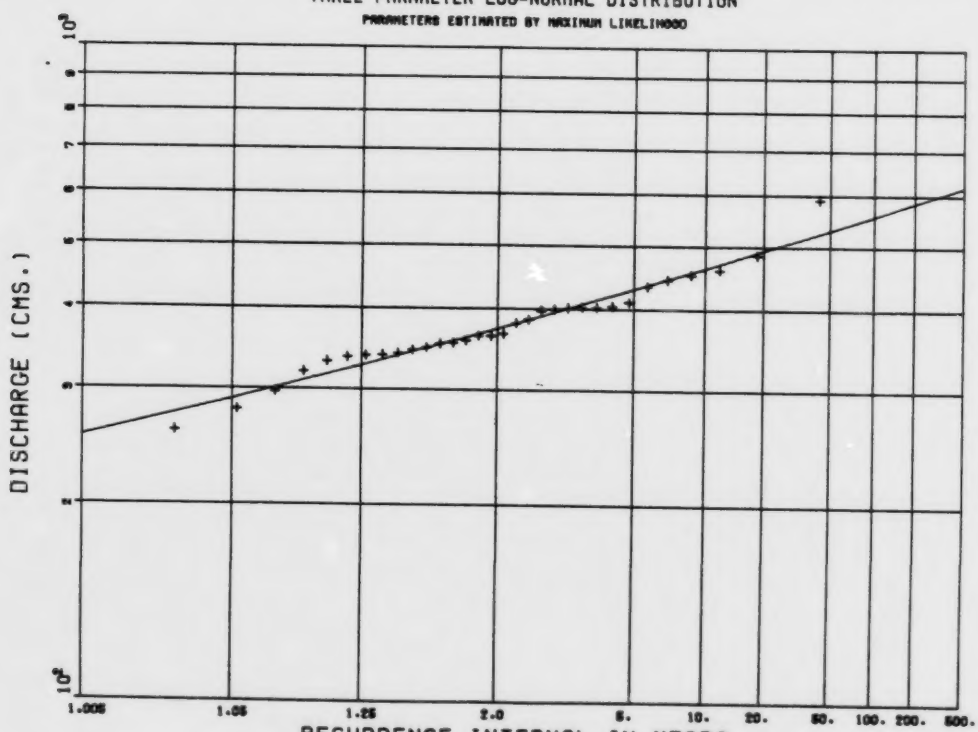
SAMPLE STATISTICS
MEAN = 379. S.D. = 64.0 C.S. = 1.0481 C.K. = 6.0437
SAMPLE STATISTICS (LOGS)
MEAN = 5.9249 S.D. = .1627 C.S. = .3137 C.K. = 4.5870
SAMPLE MIN = 259. SAMPLE MAX = 590. N = 32

PARAMETERS FOR GUMBEL I A = .018764 U = 350.
PARAMETERS FOR LOGNORMAL M = 5.9249 S = .1627
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 100. M = 5.6070 S = .2228
STATISTICS OF LOG(X-A)
MEAN = 5.6070 S.D. = .2228 C.S. = .0580 C.K. = 4.4584
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0255 B = .4066E+02 LOG(M) = 4.8873
ME= .1326E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0152 B = .1101E+03
LOG(M)F= 4.2473 M = .6992E+02
DISTRIBUTION STATISTICS MEAN = 5.9249 S.D. = .1599 C.S. = .1906

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	261.		246.		254.		255.		258.	
1.050	291.		286.		289.		290.		291.	
1.250	325.		326.		326.		327.		326.	
2.000	346.		374.		372.		372.		371.	
2.330	381.	3.14	395.	2.90	383.	3.12	383.	3.08	382.	3.18
5.000	430.	3.95	429.	3.35	429.	3.52	427.	3.47	428.	3.64
10.000	470.	4.63	461.	3.88	462.	4.27	461.	4.22	463.	4.52
20.000	509.	5.24	489.	4.41	493.	5.28	491.	5.26	496.	5.75
50.000	556.	5.94	523.	5.07	530.	6.85	528.	6.93	537.	7.74
100.000	595.	6.40	546.	5.54	557.	8.11	555.	8.33	567.	9.40
200.000	632.	6.81	569.	5.98	584.	9.43	581.	9.82	597.	11.20
500.000	681.	7.29	598.	6.53	617.	11.28	616.	11.90	637.	13.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

FRENCH RIVER AT FRENCH RIVER 02DD004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I117.0

FRENCH RIVER AT LAKE NIPISSING 0200007

DRAINAGE AREA : 12300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1952 - 1982

SAMPLE STATISTICS
MEAN = 329. S.D. = 56.6 C.S. = .9219 C.K. = 8.0962
SAMPLE STATISTICS (LOGS)
MEAN = 5.7834 S.D. = .1720 C.S. = -.4163 C.K. = 7.3162
SAMPLE MIN = 189. SAMPLE MAX = 524. N = 31

PARAMETERS FOR GUMBEL I A = .018164 U = 303.
PARAMETERS FOR LOGNORMAL M = 5.7834 S = .1720
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -205. M = 6.2766 S = .1040
STATISTICS OF LOG(X-A)
MEAN = 6.2766 S.D. = .1040 C.S. = .1080 C.K. = 7.1454
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8358 B = .2308E+02 LOG(M) = 6.6095
ME= .7421E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0101 B = .2797E+03
LOG(M)F= 8.6047 M = .5457E+04
DISTRIBUTION STATISTICS MEAN = 5.7834 S.D. = .1687 C.S. = -.1196

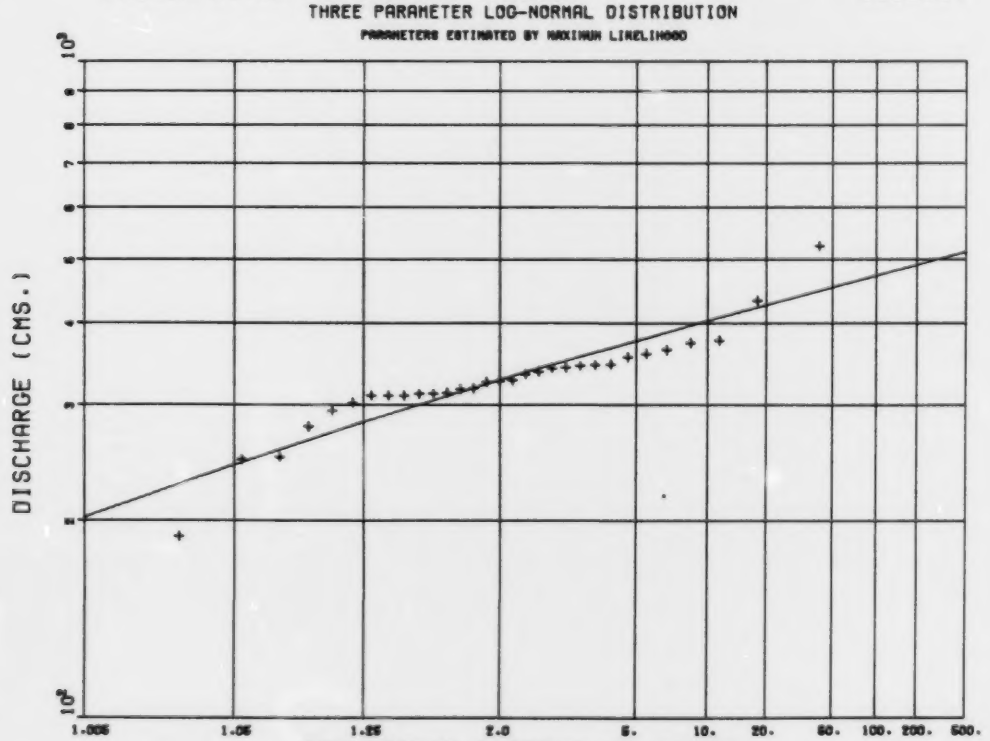
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	211.		209.		202.		206.		195.	
1.050	242.		245.		243.		245.		240.	
1.250	277.		281.		282.		282.		287.	
2.000	323.		325.		327.		326.		329.	
2.330	335.	3.75	335.	3.11	337.	3.25	336.	3.26	339.	3.32
5.000	386.	4.62	375.	3.59	375.	3.37	375.	3.43	376.	3.20
10.000	427.	5.35	405.	4.17	403.	3.89	402.	3.94	401.	3.48
20.000	467.	5.99	431.	4.74	426.	4.67	426.	4.76	422.	4.17
50.000	518.	6.72	462.	5.45	453.	5.51	454.	6.16	445.	5.49
100.000	556.	7.18	485.	5.95	472.	6.92	474.	7.36	460.	6.65
200.000	595.	7.60	506.	6.42	490.	7.96	492.	8.64	473.	7.90
500.000	645.	8.08	533.	7.01	513.	9.36	515.	10.40	490.	9.61

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

FRENCH RIVER AT LAKE NIPISSING 0200007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I118.0

GANARASKA RIVER NEAR DALE 02HD002

DRAINAGE AREA = 262.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1954 - 1975

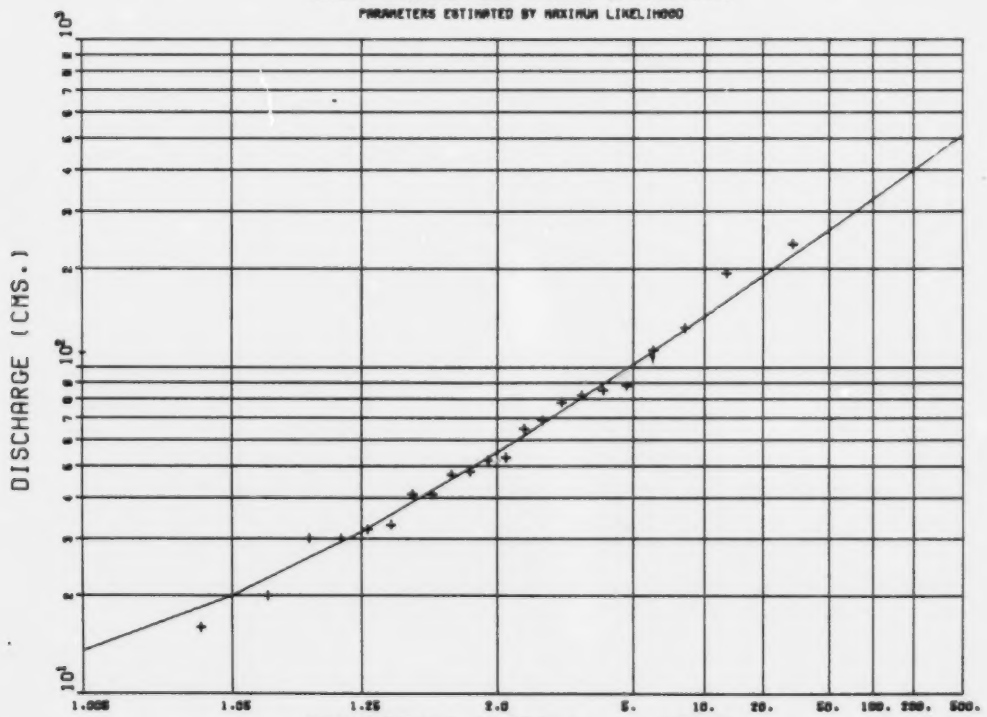
SAMPLE STATISTICS
MEAN = 72. S.D. = 55.5 C.S. = 1.8263 C.K. = 6.8417
SAMPLE STATISTICS (LOGS)
MEAN = 4.0475 S.D. = .6836 C.S. = .2629 C.K. = 3.3609
SAMPLE MIN = 16. SAMPLE MAX = 238. N = 22

PARAMETERS FOR GUMBEL I A = .030244 U = 50.
PARAMETERS FOR LOGNORMAL M = 4.0475 S = .6836
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 8. M = 3.8540 S = .8205
STATISTICS OF LOG(X-A)
MEAN = 3.8540 S.D. = .8205 C.S. = -.0322 C.K. = 3.5080
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0899 B = .5787E+02 LOG(M) =-1.1527
ME= .3158E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1145 B = .3421E+02
LOG(M)F= .1306 M = .1139E+01
DISTRIBUTION STATISTICS MEAN = 4.0475 S.D. = .6697 C.S. = .3419

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-5.		18.		14.		13.		12.	
1.050	13.		19.		20.		20.		20.	
1.250	34.		32.		31.		32.		32.	
2.000	62.		57.		55.		55.		56.	
2.330	69.	12.90	65.	14.70	62.	15.90	62.	15.50	63.	16.10
5.000	100.	12.70	102.	17.00	102.	18.20	99.	18.20	101.	18.20
10.000	125.	13.10	138.	19.70	143.	22.90	138.	22.60	140.	22.40
20.000	148.	13.40	176.	22.40	190.	27.40	183.	28.50	185.	28.40
50.000	179.	13.80	233.	25.70	262.	33.20	255.	37.70	256.	37.90
100.000	202.	14.10	281.	28.13	326.	37.40	321.	45.40	320.	45.90
200.000	225.	14.30	333.	30.30	398.	41.50	399.	53.50	395.	54.40
500.000	256.	14.50	410.	33.10	509.	46.70	522.	64.70	511.	66.20

F.E. = FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

GANARASKA RIVER NEAR DALE 02HD002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I119.0
I-123

GANARASKA RIVER NEAR OSACA 02HD003

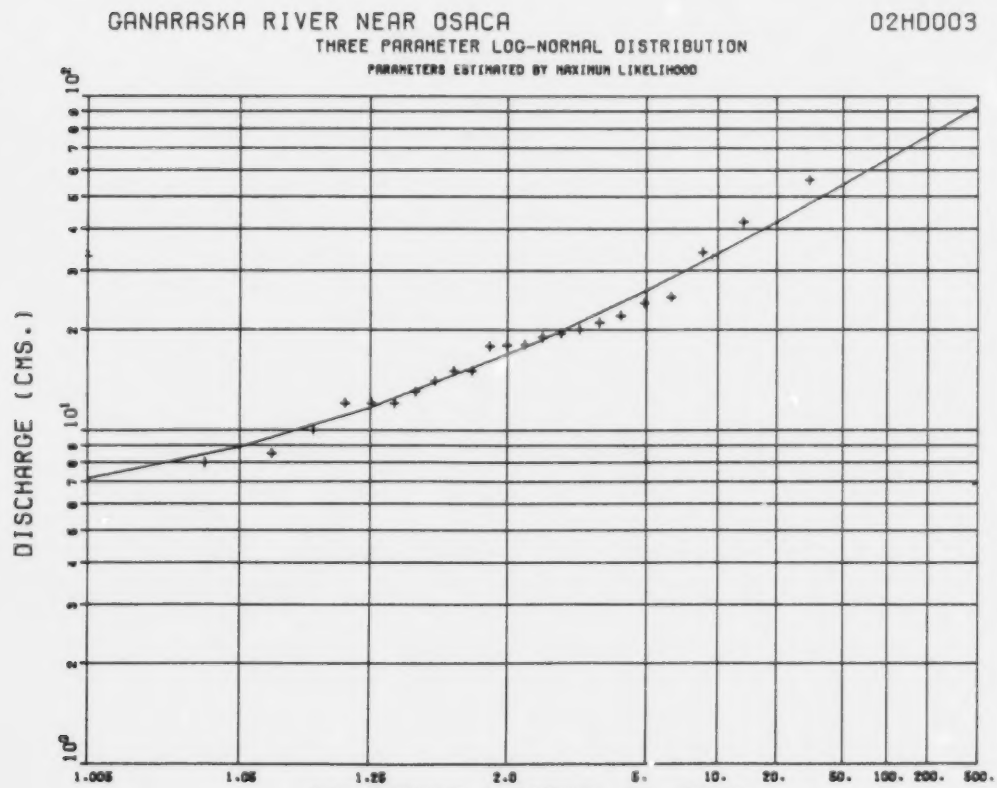
DRAINAGE AREA : 67.3 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1960 - 1982

SAMPLE STATISTICS
MEAN = 20. S.D. = 11.2 C.S. = 1.9768 C.K. = 7.9375
SAMPLE STATISTICS (LOGS)
MEAN = 2.8689 S.D. = .4753 C.S. = .6028 C.K. = 4.0087
SAMPLE MIN = 8. SAMPLE MAX = 56. N = 23

PARAMETERS FOR GUMBEL I A = .148495 U = 15.
PARAMETERS FOR LOGNORMAL M = 2.8689 S = .4753
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 2.4391 S = .7071
STATISTICS OF LOG(X-A)
MEAN = 2.4391 S.D. = .7071 C.S. = -.0424 C.K. = 3.7034
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1433 B = .1101E+02 LOG(M) = 1.2920
ME= .3640E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1529 B = .9358E+01
LOG(M)F= 1.4385 M = .4214E+01
DISTRIBUTION STATISTICS MEAN = 2.8689 S.D. = .4676 C.S. = .6538

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	4.		5.		7.		7.		7.	
1.050	8.		8.		9.		9.		9.	
1.250	12.		12.		12.		12.		12.	
2.000	16.		16.		17.		17.		17.	
2.330	19.	9.22	19.	9.99	18.	10.90	18.	10.50	18.	11.30
5.000	26.	9.91	26.	11.50	26.	13.70	26.	13.20	26.	13.40
10.000	31.	10.60	32.	13.40	34.	17.20	33.	17.10	33.	17.30
20.000	35.	11.20	39.	15.20	42.	21.20	41.	22.00	41.	22.90
50.000	42.	11.80	47.	17.50	54.	26.50	54.	29.20	54.	32.00
100.000	46.	12.20	53.	19.10	65.	30.40	65.	35.10	65.	39.60
200.000	51.	12.60	60.	20.60	76.	34.20	78.	41.30	78.	47.70
500.000	57.	12.90	69.	22.50	93.	39.00	99.	49.90	99.	59.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I120.0

GOULAIS RIVER NEAR SEARCHMONT 02BF002

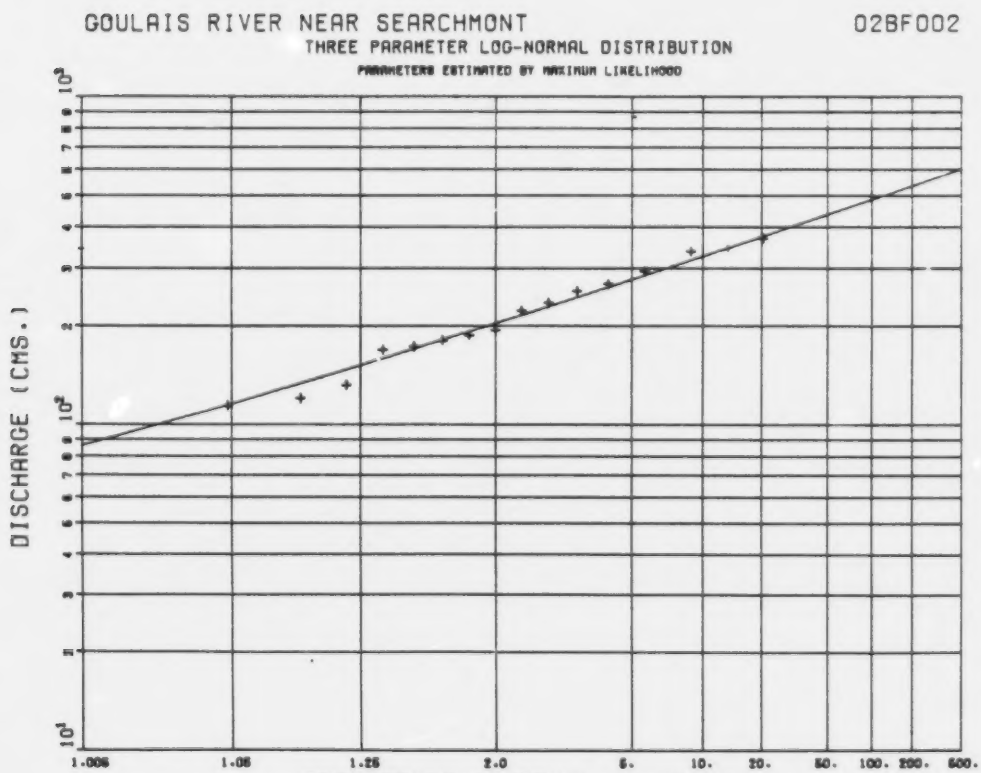
DRAINAGE AREA = 1160.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

SAMPLE STATISTICS
MEAN = 217. S.D. = 76.7 C.S. = .5738 C.K. = 3.3393
SAMPLE STATISTICS (LOGS)
MEAN = 5.3193 S.D. = .3573 C.S. = -.0532 C.K. = 3.0156
SAMPLE MIN = 114. SAMPLE MAX = 370. N = 15

PARAMETERS FOR GUMBEL I A = .016569 U = 182.
PARAMETERS FOR LOGNORMAL P = 5.3193 S = .3573
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 22. M = 5.1963 S = .4038
STATISTICS OF LOG(X-A)
MEAN = 5.1963 S.D. = .4038 C.S. = -.1340 C.K. = 3.0367
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8195 B = .1411E+04 LOG(M) = 18.7394
ME= .1375E+09
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.9262 B = .1879E+03
LOG(M)F=10.3558 M = .2329E+05
DISTRIBUTION STATISTICS MEAN = 5.3193 S.D. = .3456 C.S. = -.1459

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	81.		81.		86.		80.		80.	
1.050	114.		113.		115.		114.		113.	
1.250	153.		151.		151.		157.		151.	
2.000	204.		204.		203.		206.		205.	
5.000	267.		268.		266.		269.		268.	
10.000	317.	11.30	323.	12.50	325.	13.50	316.	11.50	322.	12.40
20.000	361.	12.20	368.	14.20	373.	16.40	355.	13.80	366.	15.10
50.000	417.	13.10	425.	16.30	436.	20.70	404.	17.80	421.	19.60
100.000	459.	13.70	469.	17.80	484.	24.00	440.	21.30	462.	23.50
200.000	501.	14.20	513.	19.20	533.	27.30	475.	25.00	504.	27.60
500.000	557.	14.80	571.	20.90	600.	31.60	520.	30.10	558.	33.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I121.0

GRAND RIVER AT BELLWOOD 02GA001

DRAINAGE AREA : 760.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1913 - 1923

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	195.	103.	-.240	4.612
LN X SERIES	4.96	1.18	-2.267	14.372

X(MIN)= 5. CMS. TOTAL SAMPLE SIZE= 11
X(MAX)= 338. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

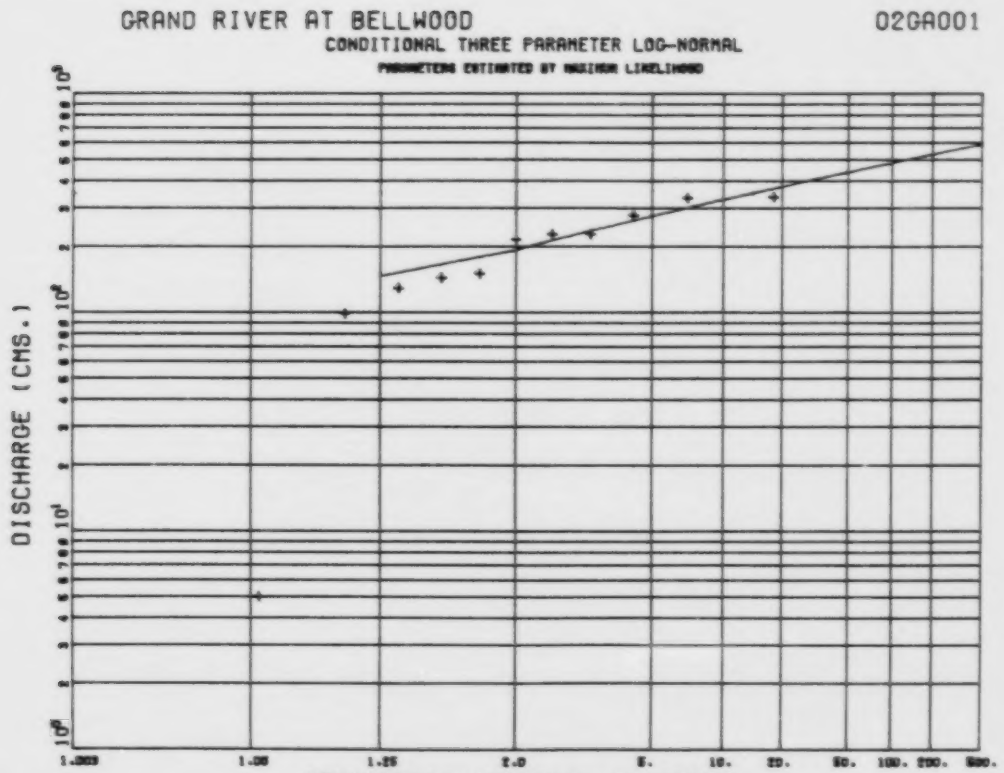
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	215.	84.	.261	3.980
LN X SERIES	5.26	.42	-.279	4.045
LN (X-A) SERIES	5.56	.32	-.146	3.895

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -58.2519 M = 5.5642 S = .3174

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	146.
2.000	.500	192.
2.350	.429	209.
5.000	.200	275.
10.000	.100	327.
20.000	.050	375.
50.000	.020	436.
100.000	.010	480.
200.000	.005	527.
500.000	.002	586.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I122.0

GRAND RIVER AT BRANTFORD (NATURALIZED DISCHARGES) 02GB001

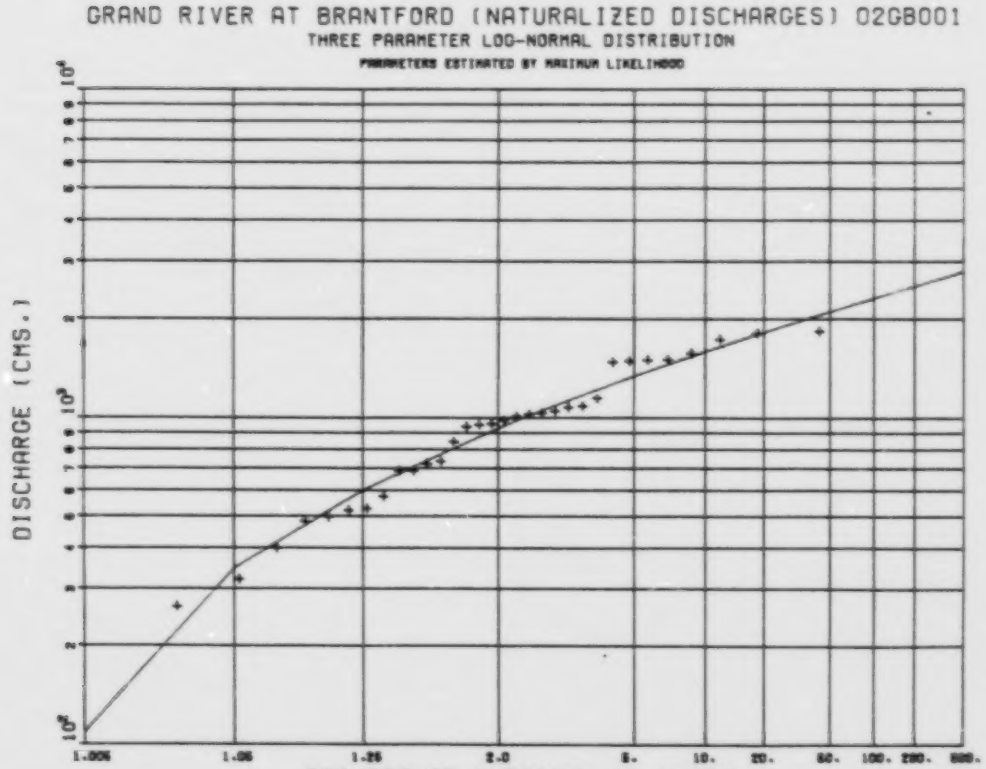
DRAINAGE AREA = 5210.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1948 - 1979

SAMPLE STATISTICS
MEAN = 982. S.D. = 444.2 C.S. = .3572 C.K. = 2.5572
SAMPLE STATISTICS (LOGS)
MEAN = 6.7772 S.D. = .5066 C.S. = -.5524 C.K. = 3.8632
SAMPLE MIN = 264. SAMPLE MAX = 1833. N = 32

PARAMETERS FOR GUMBEL I A = .002683 U = 772.
PARAMETERS FOR LOGNORMAL M = 6.7772 S = .5066
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -769. M = 7.4369 S = .2560
STATISTICS OF LOG(X-A)
MEAN = 7.4369 S.D. = .2560 C.S. = -.8763 C.K. = 2.5149
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1399 B = .1311E+02 LOG(M) = 8.6113
ME= .5443E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3403 B = .2558E+01
LOG(P)F= 7.6463 M = .2093E+04
DISTRIBUTION STATISTICS MEAN = 6.7772 S.D. = .5443 C.S. =-1.2526

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	150.		238.		107.		115.		183.	
1.050	357.		381.		345.		310.		355.	
1.250	595.		573.		599.		593.		584.	
2.000	989.		878.		928.		978.		919.	
2.333	1085.	8.46	960.	9.03	1010.	8.56	1070.	8.32	1005.	9.63
5.000	1330.	8.92	1340.	10.40	1340.	8.31	1380.	6.84	1350.	8.87
10.000	1610.	9.46	1680.	12.10	1590.	9.30	1580.	6.07	1620.	9.45
20.000	1880.	9.92	2020.	13.70	1820.	10.80	1710.	5.46	1850.	11.48
50.000	2230.	10.48	2480.	15.80	2180.	13.20	1840.	4.91	2230.	15.48
100.000	2490.	10.78	2850.	17.20	2310.	15.10	1910.	4.72	2520.	18.92
200.000	2750.	11.00	3240.	18.60	2510.	16.90	1960.	4.73	2800.	22.60
500.000	3090.	11.20	3770.	20.30	2780.	19.30	2010.	4.97	2720.	27.68

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I123.0

GRAND RIVER AT BRANTFORD (REGULATED DISCHARGES) 02GB001

DRAINAGE AREA : 5210.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1948 - 1982

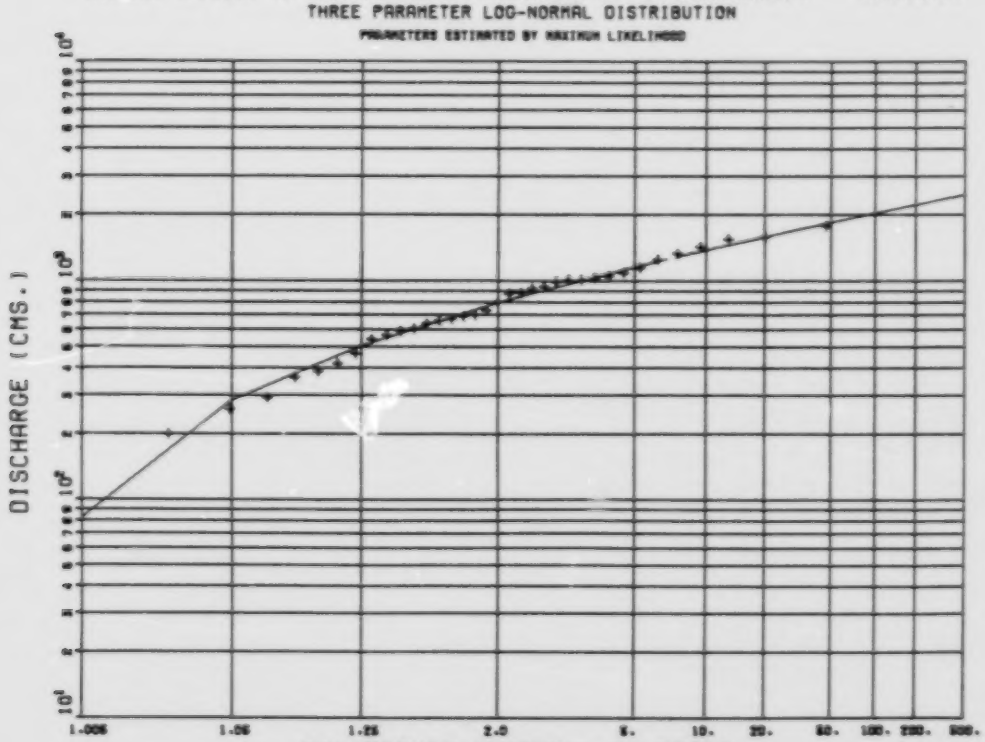
SAMPLE STATISTICS
MEAN = 841. S.D. = 394.3 C.S. = .5093 C.K. = 3.0725
SAMPLE STATISTICS (LOGS)
MEAN = 6.6136 S.D. = .5273 C.S. = -.6223 C.K. = 3.3428
SAMPLE MIN = 199. SAMPLE MAX = 1780. N = 35

PARAMETERS FOR GUMBEL I A = .003054 U = 656.
PARAMETERS FOR LOGNORMAL P = 6.6136 S = .5273
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -621. M = 7.2524 S = .2785
STATISTICS OF LOG(X-A)
MEAN = 7.2524 S.D. = .2785 C.S. = -.0600 C.K. = 2.7445
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1641 B = .1033E+02 LOG(M) = 8.3886
ME= .4058E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2341 B = .5143E+01
LOG(M)= 7.8179 M = .2484E+04
DISTRIBUTION STATISTICS MEAN = 6.6136 S.D. = .5309 C.S. = -.8819

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	110.		192.		82.		123.		141.	
1.050	292.		313.		284.		279.		288.	
1.250	501.		478.		503.		496.		490.	
2.000	776.		745.		791.		804.		787.	
2.333	846.	8.30	819.	8.98	864.	8.43	878.	8.64	861.	9.61
5.000	1150.	8.69	1160.	10.40	1150.	8.28	1170.	7.76	1170.	8.61
10.000	1390.	9.18	1470.	12.80	1380.	9.19	1370.	7.49	1400.	9.18
20.000	1630.	9.61	1770.	14.70	1590.	10.70	1540.	7.65	1620.	11.10
50.000	1930.	10.10	2200.	17.20	1840.	13.00	1710.	8.50	1850.	15.20
100.000	2160.	10.30	2540.	17.20	2030.	14.80	1820.	9.50	2000.	18.80
200.000	2390.	10.60	2900.	18.50	2210.	16.70	1920.	10.70	2140.	22.60
500.000	2690.	10.80	3400.	20.20	2460.	19.00	2020.	12.50	2320.	27.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT BRANTFORD (REGULATED DISCHARGES) 02GB001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I123.1

GRAND RIVER AT CONESTOGO 02GA002

DRAINAGE AREA : 1420.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1914 - 1923

SAMPLE STATISTICS
MEAN = 310. S.D. = 73.7 C.S. = .0287 C.K. = 2.6376
SAMPLE STATISTICS (LOGS)
MEAN = 5.7085 S.D. = .2447 C.S. = -.1644 C.K. = 2.7722
SAMPLE MIN = 208. SAMPLE MAX = 409. N = 10

PARAMETERS FOR GUMBEL I A = .016345 U = 275.
PARAMETERS FOR LOGNORMAL M = 5.7085 S = .2447
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -416. M = 5.5827 S = .1.19
STATISTICS OF LOG(X-A)
MEAN = 6.5827 S.D. = .1019 C.S. = -.0571 C.K. = 2.6652
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0226 B = .1175E+03 LOG(M) = 8.3621
ME= .4282E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

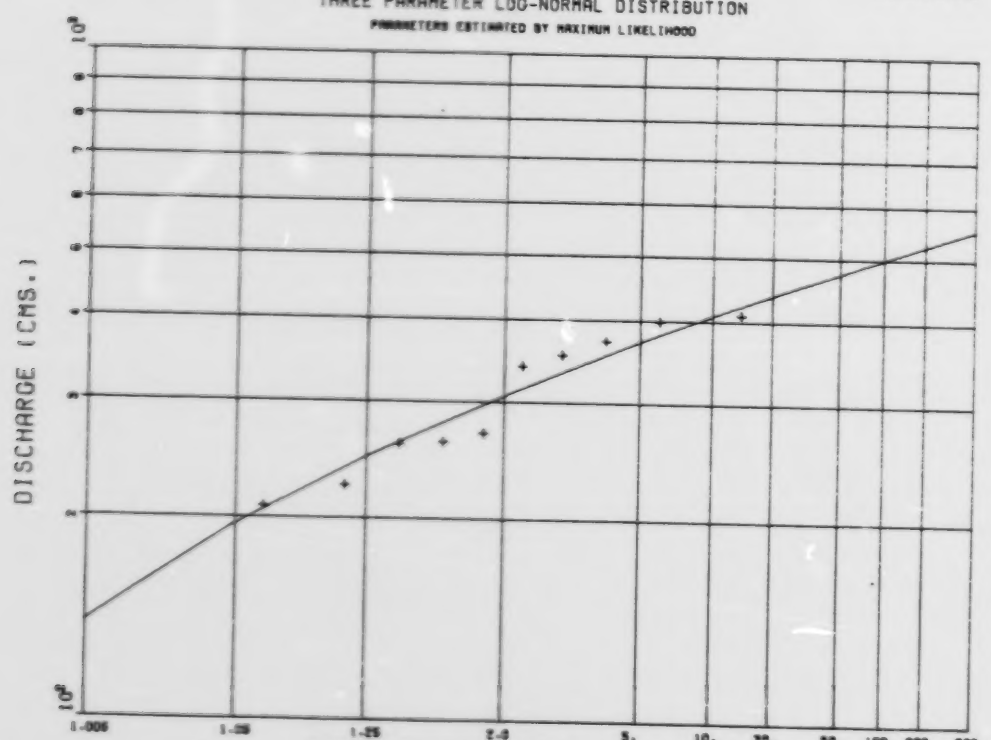
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	173.		160.		139.		0.		154.	
1.050	207.		202.		195.		0.		199.	
1.250	246.		245.		247.		0.		246.	
2.000	297.		301.		306.		0.		304.	
2.330	310.	7.91	315.	7.80	319.	8.62	0.	0.00	317.	8.33
5.000	367.	9.51	370.	9.81	371.	7.99	0.	0.00	371.	9.60
10.000	417.	10.80	412.	10.40	407.	9.00	0.	0.00	410.	9.77
20.000	457.	12.00	451.	11.90	438.	10.60	0.	0.00	445.	11.80
50.000	514.	13.20	498.	13.60	474.	13.20	0.	0.00	486.	15.30
100.000	556.	14.10	533.	14.90	499.	15.30	0.	0.00	515.	18.30
200.000	599.	14.60	566.	16.10	523.	17.40	0.	0.00	543.	21.50
500.000	655.	15.60	610.	17.60	553.	20.20	0.	0.00	576.	26.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT CONESTOGO 02GA002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I124.0

GRAND RIVER AT GALT (1914-79 1943-79 *NAT.*) 02GA003

DRAINAGE AREA : 3520.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1914 - 1979

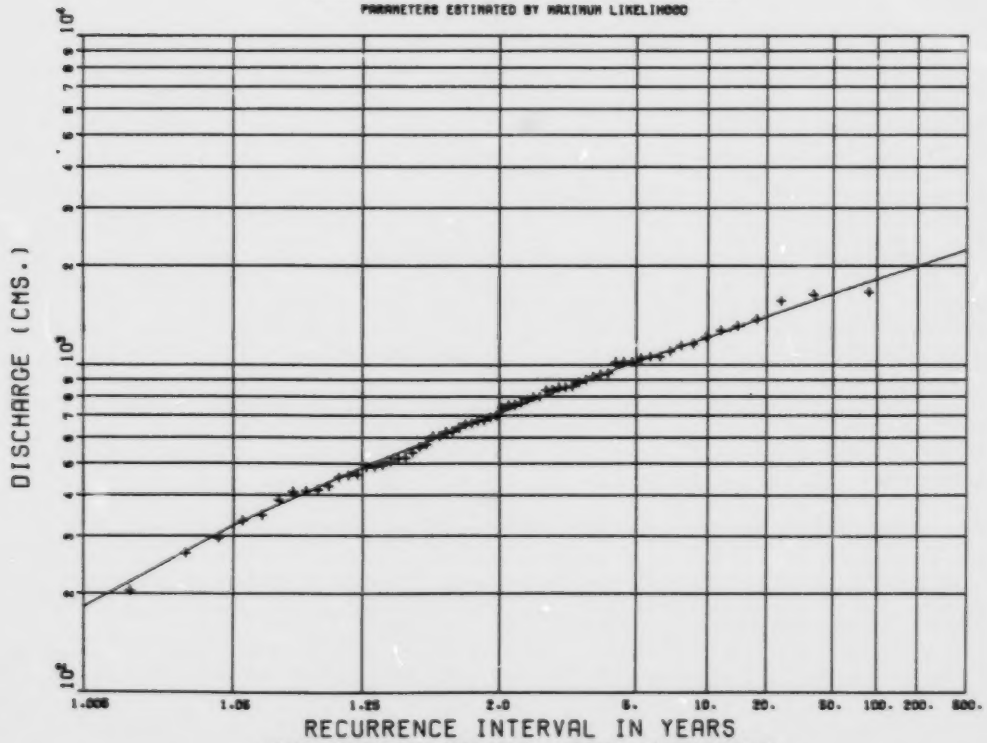
SAMPLE STATISTICS
MEAN = 766. S.D. = 330.2 C.S. = .7631 C.K. = 3.4892
SAMPLE STATISTICS (LOGS)
MEAN = 6.5476 S.D. = .4474 C.S. = -.3180 C.K. = 3.0740
SAMPLE MIN = 204. SAMPLE MAX = 1662. N = 66

PARAMETERS FOR GUMBEL I A = .003796 U = 614.
PARAMETERS FOR LOGNORMAL P = 6.5476 S = .4474
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -193. M = 6.8089 S = .3422
STATISTICS OF LOG(X-A)
MEAN = 6.8089 S.D. = .3422 C.S. = -.0478 C.K. = 2.7929
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8711 B = .3955E+02 LOG(P) = 9.3609
ME= .1162E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0899 B = .2457E+02
LOG(M)F= 6.7552 M = .6344E+04
DISTRIBUTION STATISTICS MEAN = 6.5476 S.D. = .4454 C.S. = -.4035

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	175.		220.		182.		187.		193.	
1.050	321.		334.		323.		320.		322.	
1.250	489.		479.		486.		485.		483.	
2.000	711.		698.		713.		719.		714.	
2.330	767.	5.36	755.	5.55	770.	5.62	777.	5.74	773.	5.91
5.000	1010.	5.79	1020.	6.41	1020.	5.84	1020.	5.69	1020.	5.88
10.000	1210.	6.21	1240.	7.43	1210.	6.77	1210.	6.16	1220.	6.52
20.000	1400.	6.57	1460.	8.45	1400.	8.04	1370.	7.11	1400.	7.40
50.000	1640.	6.94	1760.	9.71	1640.	9.52	1580.	8.91	1620.	10.20
100.000	1830.	7.18	1970.	10.60	1820.	11.40	1720.	10.50	1780.	12.20
200.000	2010.	7.37	2210.	11.40	1990.	12.80	1860.	12.30	1930.	14.50
500.000	2250.	7.59	2530.	12.50	2230.	14.80	2030.	14.70	2140.	17.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT GALT (1914-79 :943-79 'NAT.') 02GA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I125.0

GRAND RIVER AT GALT (1914 - 1942) 02GA003

DRAINAGE AREA = 3520.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1914 - 1942

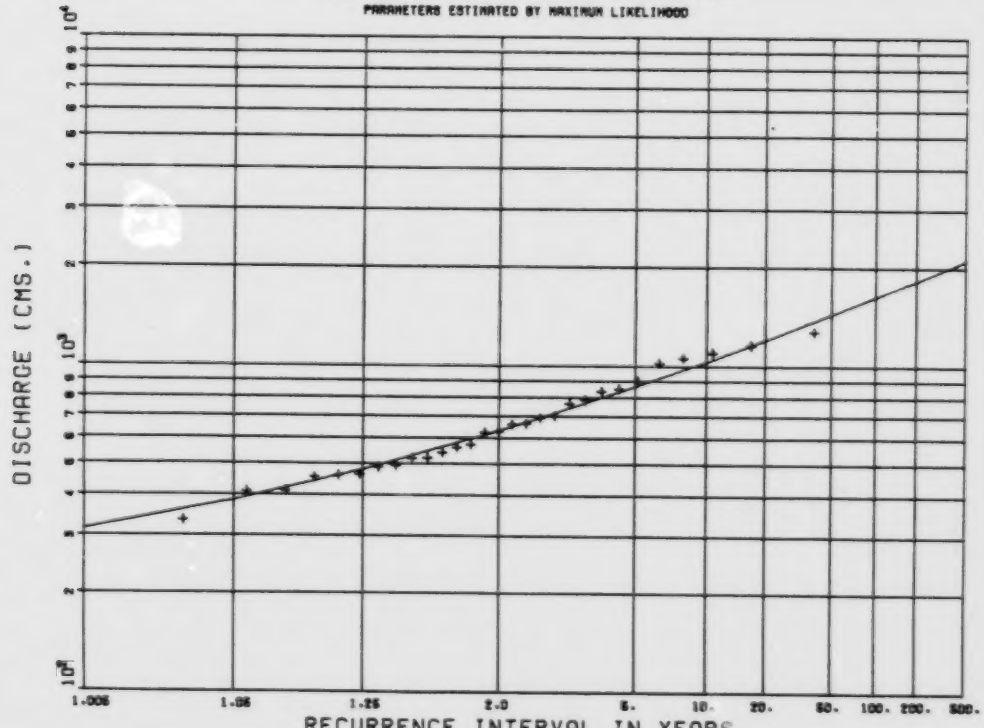
SAMPLE STATISTICS
MEAN = 687. S.D. = 247.8 C.S. = .8195 C.K. = 3.1759
SAMPLE STATISTICS (LOGS)
MEAN = 6.4728 S.D. = .3478 C.S. = .2488 C.K. = 2.6278
SAMPLE MIN = 333. SAMPLE MAX = 1273. N = 29

PARAMETERS FOR GUMBEL I A = .005431 U = 576.
PARAMETERS FOR LOGNORMAL M = 6.4728 S = .3478
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 199. M = 6.0867 S = .5148
STATISTICS OF LOG(X-A)
MEAN = 6.0867 S.D. = .5148 C.S. = -.0973 C.K. = 2.8647
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0417 B = .6946E+02 LOG(M) = 3.5737
ME= .3565E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0029 B = .1738E+02
LOG(P)F= 5.8372 M = .1541E+03
DISTRIBUTION STATISTICS MEAN = 6.4728 S.D. = .3450 C.S. = .4808

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	268.		264.		313.		318.		286.	
1.050	371.		365.		383.		386.		374.	
1.250	488.		483.		478.		482.		481.	
2.000	643.		647.		630.		638.		638.	
2.330	682.		689.		671.		679.		679.	
5.000	852.	6.36	868.	6.51	864.	7.11	856.	6.94	863.	7.09
10.000	990.	7.23	1010.	7.52	1030.	8.57	1020.	8.40	1020.	8.03
20.000	1120.	7.98	1150.	8.72	1200.	10.70	1190.	10.60	1170.	9.84
50.000	1290.	8.61	1320.	9.91	1440.	13.30	1430.	13.50	1380.	12.40
100.000	1420.	9.29	1450.	11.40	1630.	16.50	1630.	18.00	1550.	16.60
200.000	1550.	9.71	1590.	12.40	1820.	19.70	1840.	21.60	1720.	20.30
500.000	1720.	10.10	1760.	13.40	2100.	22.40	2150.	25.50	1950.	23.70
		10.50		14.70		26.00		30.80		29.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT GALT (1914 - 1942) 02GA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I125.1

GRAND RIVER AT GALT (1943 - 79 - NATURALIZED) 02GA003

DRAINAGE AREA = 3520.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1943 - 1979

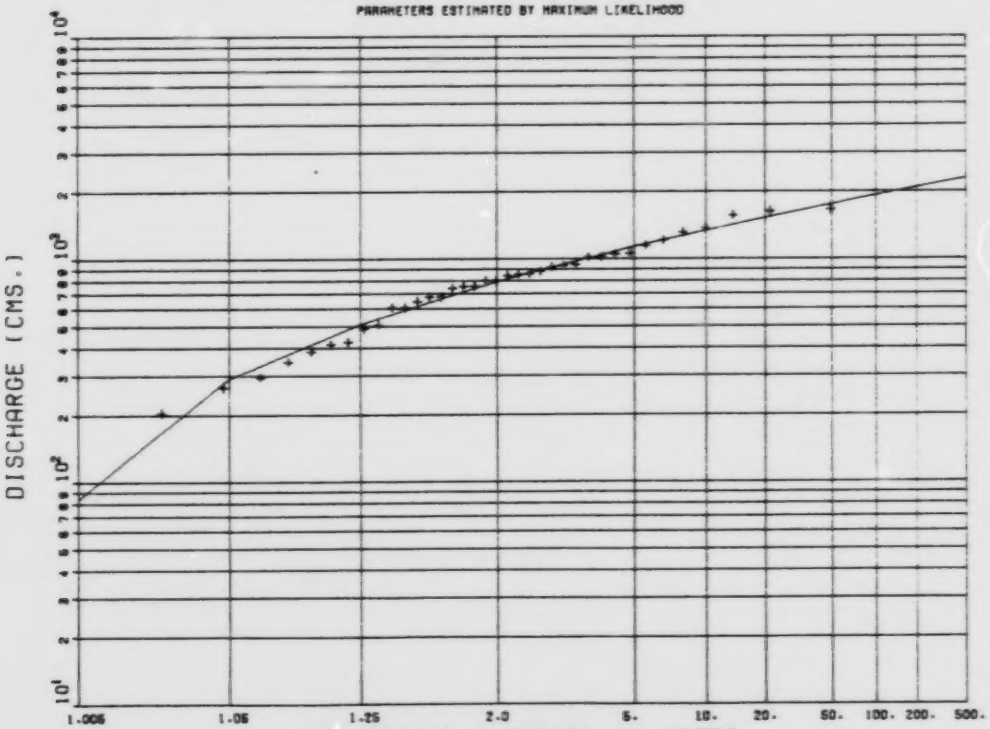
SAMPLE STATISTICS
MEAN = 424. S.D. = 374.3 C.S. = .4935 C.K. = 3.1594
SAMPLE STATISTICS (LOGS)
MEAN = 6.6063 S.D. = .5091 C.S. = -.6531 C.K. = 3.3649
SAMPLE MIN = 204. SAMPLE MAX = 1662. N = 37

PARAMETERS FOR GUMBEL I A = .033171 U = 652.
PARAMETERS FOR LOGNORMAL M = 6.6063 S = .5051
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -754. M = 7.3398 S = .2364
STATISTICS OF LOG(X-A)
MEAN = 7.3398 S.D. = .2364 C.S. = -.0452 C.K. = 2.8298
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1662 B = .9378E+01 LOG(M) = 8.1653
ME= .3517E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2223 B = .5285E+01
LOG(M)= 7.7810 M = .2395E+04
DISTRIBUTION STATISTICS MEAN = 6.6063 S.D. = .5110 C.S. = -.8700

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	126.		139.		83.		131.		146.	
1.050	301.		320.		290.		297.		295.	
1.250	502.		482.		504.		499.		494.	
2.000	768.		740.		786.		735.		731.	
2.330	835.	7.68	810.	8.44	853.	7.86	866.	8.11	856.	9.03
5.000	1130.	8.30	1140.	9.74	1133.	7.57	1140.	7.31	1140.	8.00
10.000	1360.	8.80	1420.	11.30	1330.	8.43	1330.	7.97	1360.	8.43
20.000	1590.	9.23	1710.	12.80	1520.	9.79	1490.	7.25	1540.	10.40
50.000	1880.	9.69	2100.	14.80	1750.	11.90	1650.	8.06	1750.	14.30
100.000	2100.	9.97	2420.	16.10	1920.	13.60	1760.	9.57	1890.	17.70
200.000	2320.	10.20	2750.	17.40	2080.	15.20	1850.	10.20	2020.	21.30
500.000	2610.	10.50	3210.	19.00	2291.	17.40	1950.	11.90	2180.	26.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT GALT (1943 - 79 - NATURALIZED) 02GA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I125.2

GRAND RIVER AT GALT (1943 - 1982) 02GA003

DRAINAGE AREA : 3520.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1943 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	659.	334.	.693	3.672
LN X SERIES	6.35	.58	-.764	3.914

X(MIN)= 119. CMS.
X(MAX)= 1553. CMS.
TOTAL SAMPLE SIZE= 40
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	673.	326.	.734	3.748
LN X SERIES	6.39	.53	-.539	3.542
LN (X-A) SERIES	6.83	.33	-.049	3.041

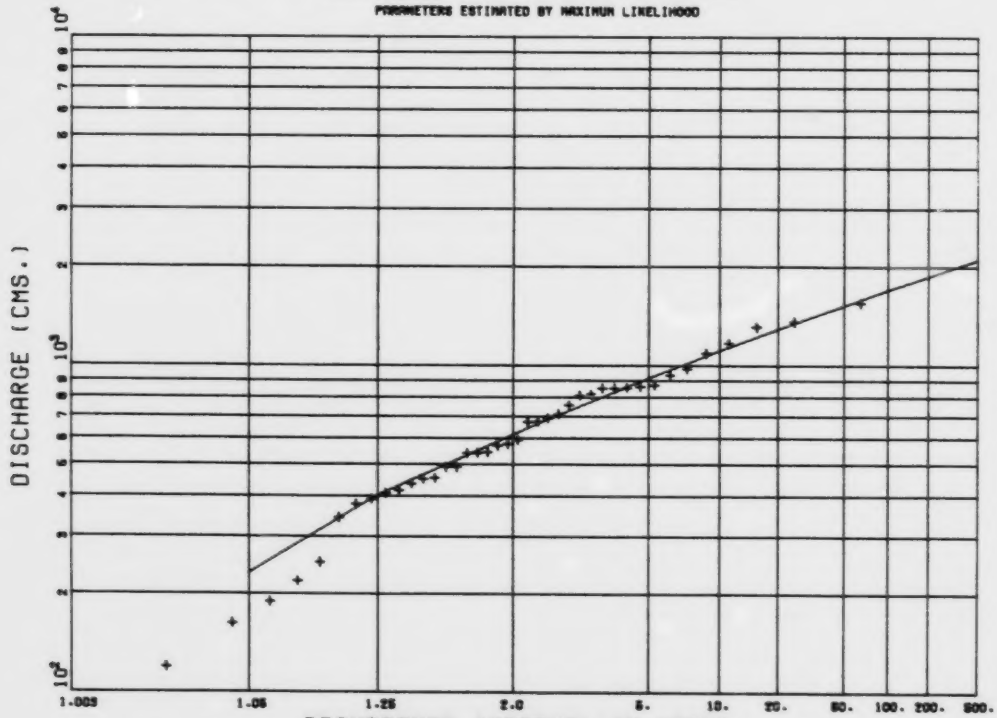
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -301.9821 M = 6.8291 S = .3326

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	231.
1.250	.800	401.
2.000	.500	613.
2.330	.429	679.
5.000	.200	913.
10.000	.100	1110.
20.000	.050	1290.
50.000	.020	1520.
100.000	.010	1700.
200.000	.005	1870.
500.000	.002	2100.

GRAND RIVER AT GALT (1943 - 1982) 02GA003
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I125.3

GRAND RIVER AT WALDERMAR 02GA022

DRAINAGE AREA : 655.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1913 - 1964

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	160.	88.	.371	5.419
LN X SERIES	4.99	.45	-.952	6.519

X(MIN)= 53. CMS. TOTAL SAMPLE SIZE= 12
X(MAX)= 289. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

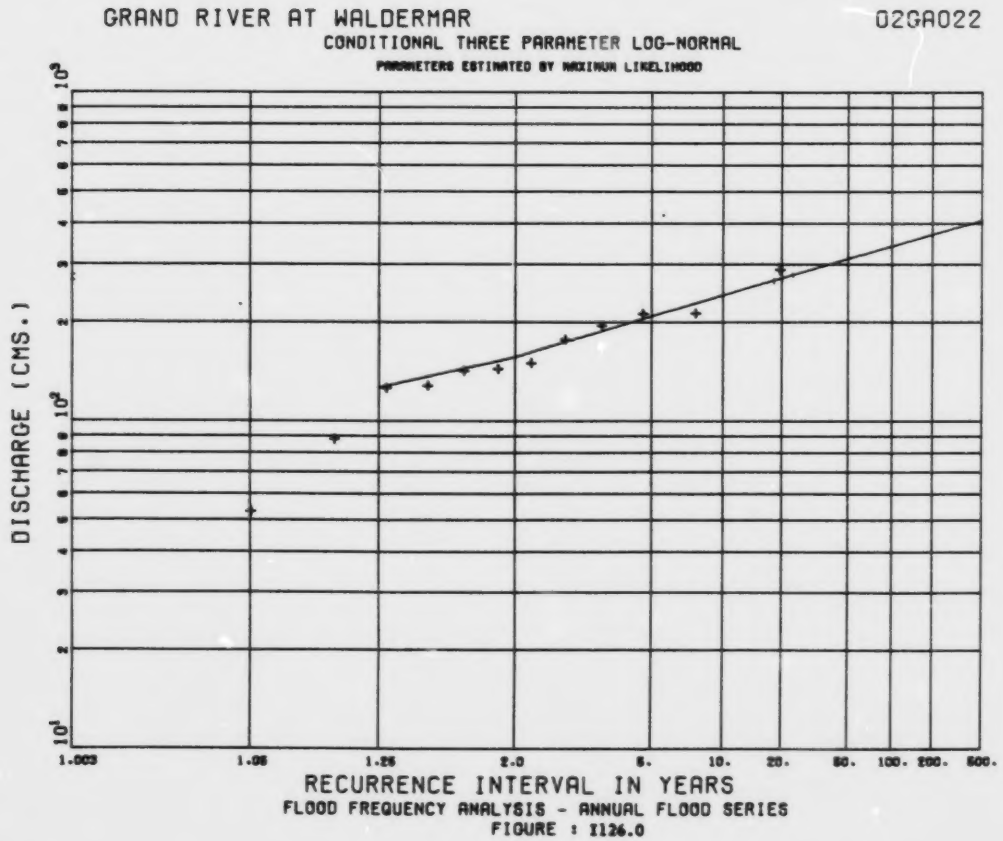
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	169.	88.	.623	6.084
LN X SERIES	5.09	.32	-.041	5.327
LN (X-A) SERIES	5.09	.32	-.037	5.324

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -.6854 M = 5.0895 S = .3230

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	126.
2.000	.500	156.
2.330	.429	166.
5.000	.200	208.
10.000	.100	241.
20.000	.050	272.
50.000	.020	311.
100.000	.010	340.
200.000	.005	369.
500.000	.002	407.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I126.0

GRAND RIVER AT WEST MONTROSE 02GA034

DRAINAGE AREA : 1170.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1960 - 1982

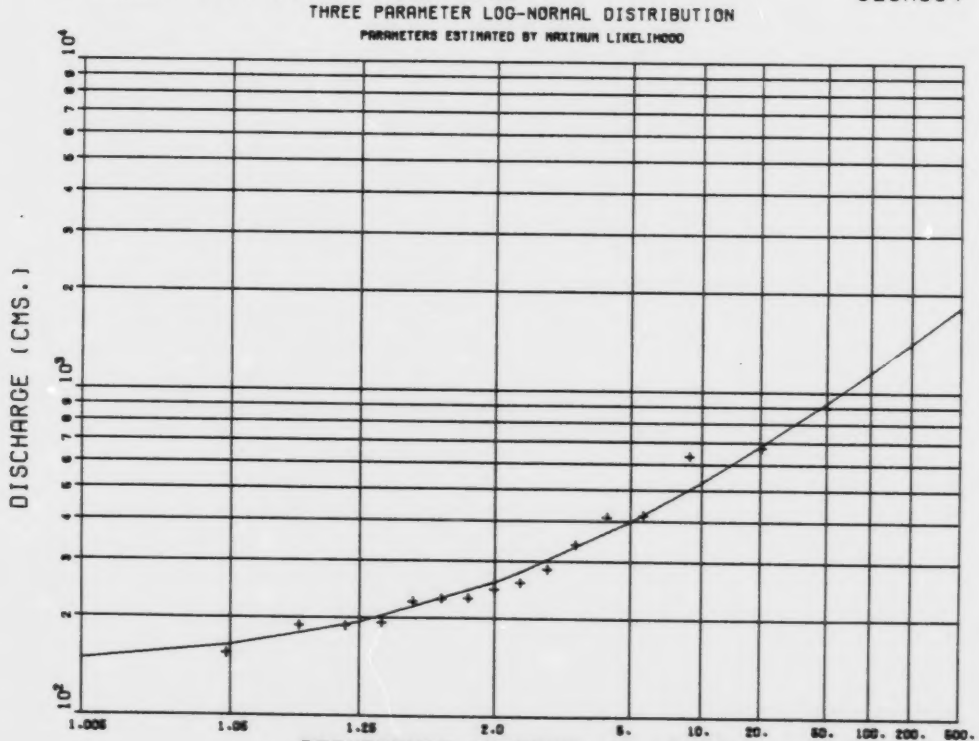
SAMPLE STATISTICS
MEAN = 311. S.D. = 159.2 C.S. = 1.4785 C.K. = 5.1897
SAMPLE STATISTICS (LOGS)
MEAN = 5.6402 S.D. = .4415 C.S. = .8567 C.K. = 3.6567
SAMPLE MIN = 155. SAMPLE MAX = 674. N = 15

PARAMETERS FOR GUMBEL I A = .010422 U = 246.
PARAMETERS FOR LOGNORMAL M = 5.6402 S = .4415
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 137. M = 4.7906 S = .9157
STATISTICS OF LOG(X-A)
MEAN = 4.7906 S.D. = .9157 C.S. = -.1028 C.K. = 3.7837
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1891 B = .5450E+01 LOG(M) = 4.6095
ME= .1804E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .2978 B = .2255E+01
LOG(M)= 4.9680 M = .1439E+03
DISTRIBUTION STATISTICS MEAN = 5.6402 S.D. = .4471 C.S. = 1.3319

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	86.		98.		148.		149.		127.	
1.050	140.		136.		164.		165.		154.	
1.250	201.		194.		193.		194.		193.	
2.000	282.		282.		257.		256.		265.	
2.330	302.	10.40	305.	11.50	279.	12.40	276.	0.00	286.	13.50
5.000	390.	11.40	406.	13.30	397.	18.10	387.	0.00	396.	16.20
10.000	462.	12.40	496.	15.40	526.	24.20	510.	0.00	507.	21.60
20.000	532.	13.20	582.	17.50	680.	30.60	664.	0.00	636.	29.60
50.000	621.	14.00	697.	20.10	926.	38.50	932.	0.00	842.	42.70
100.000	688.	14.60	786.	21.90	1150.	44.80	1200.	0.00	1030.	53.90
200.000	755.	15.20	878.	23.70	1410.	50.50	1540.	0.00	1250.	65.90
500.000	843.	15.50	1000.	25.90	1820.	57.60	2140.	0.00	1610.	82.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER AT WEST MONTROSE 02GA034
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I127.0

GRAND RIVER AT YORK - 02GB002

DRAINAGE AREA : 5910.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1914 - 1923

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	817.	221.	.329	8.487
LN X SERIES	6.67	.30	-.982	8.927

X(MIN)= 406. CMS. TOTAL SAMPLE SIZE= 10
X(MAX)= 1284. CFS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	862.	180.	1.620	11.600
LN X SERIES	6.74	.19	.857	9.974
LN (X-A) SERIES	6.12	.35	.112	9.453

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 379.9156 M = 6.1232 S = .3500

FLOOD FREQUENCY REGIME

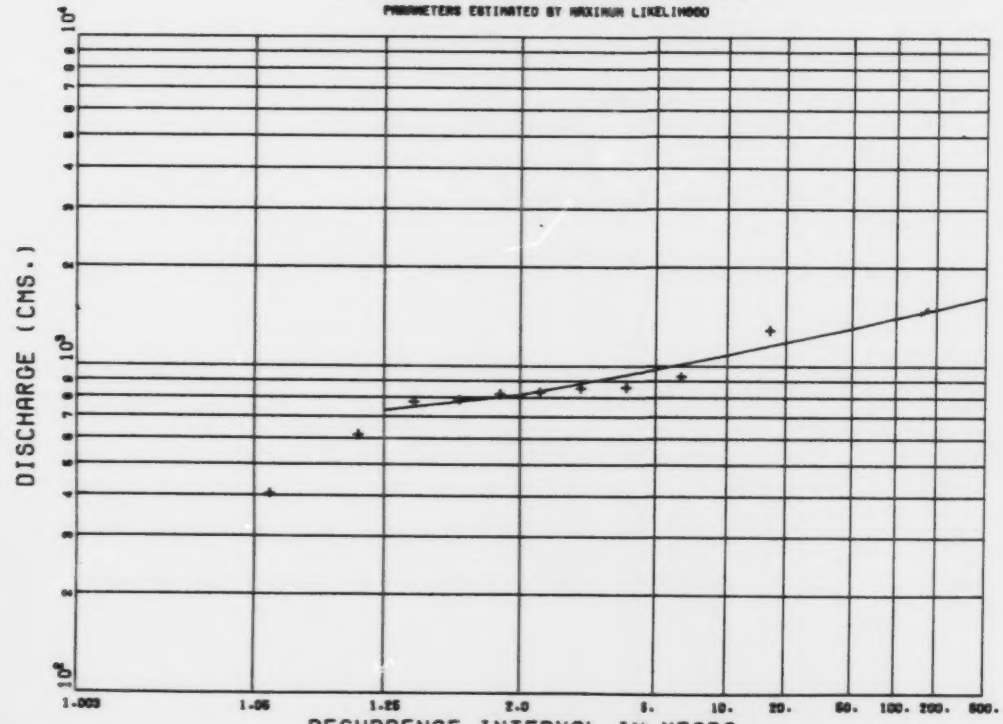
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	729.
2.000	.500	915.
2.330	.429	946.
5.000	.200	976.
10.000	.100	1043.
20.000	.050	1140.
50.000	.020	1300.
100.000	.010	1400.
200.000	.005	1490.
500.000	.002	1620.

GRAND RIVER AT YORK - 02GB002

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II28.0

GRAND RIVER BELOW SHAND DAM (NATURALIZED) 02GA016

DRAINAGE AREA : 800.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1948 - 1979

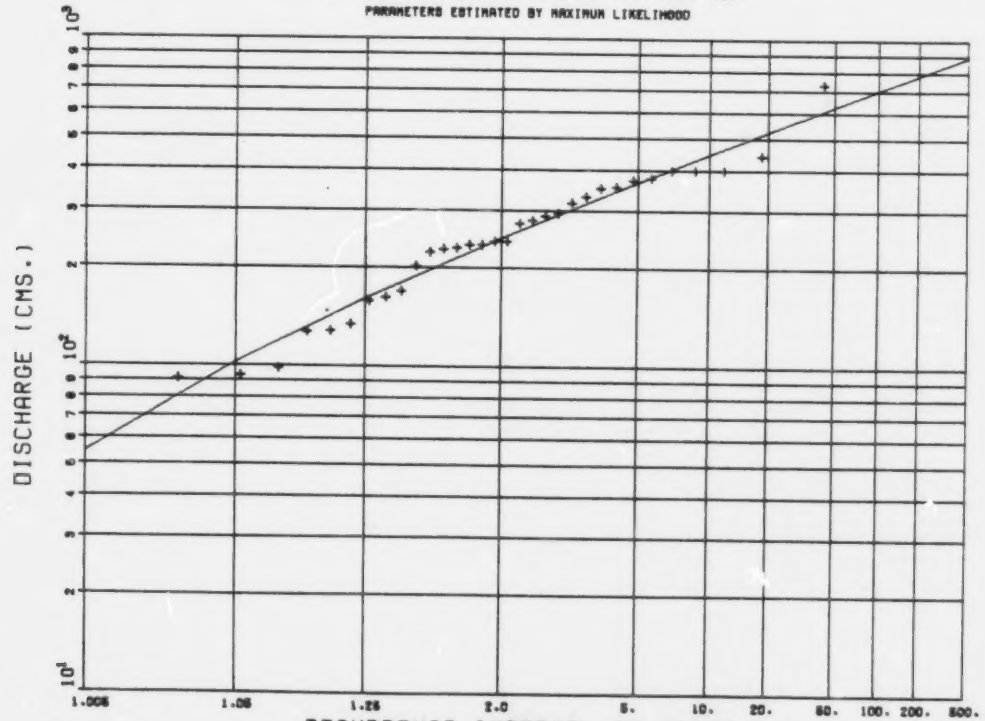
SAMPLE STATISTICS
MEAN = 269. S.D. = 131.4 C.S. = 1.3055 C.K. = 6.8477
SAMPLE STATISTICS (LOGS)
MEAN = 5.4801 S.D. = .4968 C.S. = -.2781 C.K. = 3.1249
SAMPLE MIN = 91. SAMPLE MAX = 731. N = 32

PARAMETERS FOR GUMBEL I A = .010805 U = 211.
PARAMETERS FOR LOGNORMAL M = 5.4801 S = .4968
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -52. M = 5.6927 S = .4000
STATISTICS OF LOG(X-A)
MEAN = 5.6927 S.D. = .4000 C.S. = -.0577 C.K. = 3.2005
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0691 B = .5174E+02 LOG(M) = 9.0532
ME= .8546E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0737 B = .4418E+02
LOG(M)F= 8.7284 M = .6176E+04
DISTRIBUTION STATISTICS MEAN = 5.4801 S.D. = .4891 C.S. = -.3012

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	44.		67.		54.		59.		59.	
1.050	100.		106.		102.		103.		102.	
1.250	163.		158.		160.		160.		159.	
2.000	248.		248.		245.		246.		245.	
2.330	269.	8.34	262.	8.85	267.	8.97	268.	9.16	268.	9.44
5.000	361.	8.82	364.	10.20	364.	9.40	364.	9.28	366.	9.50
10.000	436.	9.37	453.	11.90	444.	11.00	441.	10.30	446.	10.60
20.000	506.	9.84	543.	13.50	521.	13.00	513.	12.10	521.	12.70
50.000	601.	10.30	665.	15.50	623.	16.00	605.	15.30	617.	16.50
100.000	671.	10.60	762.	16.90	701.	18.30	671.	18.20	688.	19.80
200.000	740.	10.90	862.	18.20	780.	20.60	737.	21.30	758.	23.40
500.000	832.	11.20	1000.	19.90	887.	23.60	823.	25.60	850.	28.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER BELOW SHAND DAM (NATURALIZED) 02GA016
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I129.0

GRAND RIVER BELOW SHAND DAM 02GA016

DRAINAGE AREA : 800.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1951 - 1982

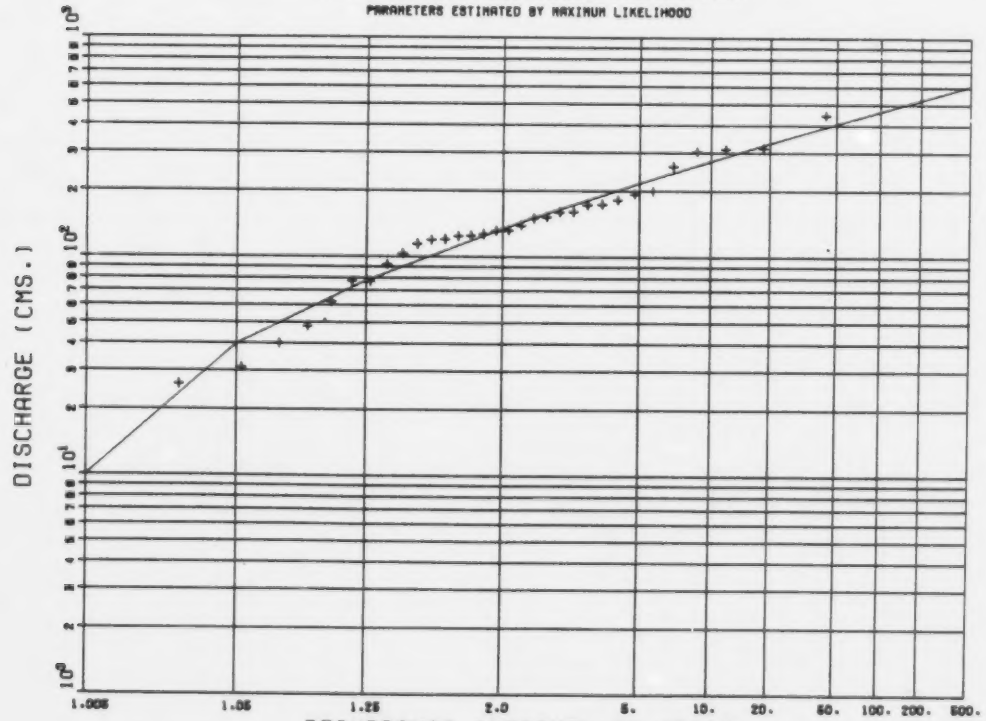
SAMPLE STATISTICS
MEAN = 152. S.D. = 92.3 C.S. = 1.3117 C.K. = 5.5439
SAMPLE STATISTICS (LOGS)
MEAN = 4.8389 S.D. = .6555 C.S. = -.6033 C.K. = 3.8172
SAMPLE MIN = 26. SAMPLE MAX = 445. N = 32

PARAMETERS FOR GUMBEL I A = .014913 U = 112.
PARAMETERS FOR LOGNORMAL M = 4.8389 S = .6555
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -48. M = 5.2035 S = .4442
STATISTICS OF LOG(X-A)
MEAN = 5.2035 S.D. = .4442 C.S. = -.0242 C.K. = 3.4266
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1977 B = .1099E+02 LOG(P) = 7.0121
ME= .1110E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1742 B = .1364E+02
LOG(M)= 7.2164 M = .1362E+04
DISTRIBUTION STATISTICS MEAN = 4.8389 S.D. = .6436 C.S. = -.5414

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	0.		23.		10.		17.		16.	
1.050	38.		43.		40.		40.		39.	
1.250	80.		73.		77.		75.		75.	
2.000	137.		126.		134.		134.		135.	
5.330	171.	9.96	142.	11.70	149.	11.00	150.	11.70	151.	12.50
5.000	213.	10.00	219.	13.50	216.	11.20	219.	11.30	221.	11.30
10.000	263.	10.40	293.	15.60	273.	12.80	275.	11.80	277.	11.90
20.000	311.	10.80	371.	17.80	330.	15.00	327.	13.20	328.	14.60
50.000	374.	11.20	486.	20.40	405.	18.20	391.	16.20	390.	19.80
100.000	421.	11.40	580.	22.30	463.	20.70	437.	19.00	434.	24.40
200.000	467.	11.60	684.	24.10	523.	23.10	481.	22.00	475.	29.30
500.000	529.	11.80	835.	26.30	606.	26.20	536.	26.20	526.	35.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

GRAND RIVER BELOW SHAND DAM 02GA016
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I129.1

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

GRAND RIVER NEAR MARSVILLE 02GA014

DRAINAGE AREA : 694.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD: 1948 - 1981

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	243.	87.	1.116	4.053
LN X SERIES	5.44	.33	.668	3.341
LN (X-A) SERIES	4.44	.8[illegible]	-.371	2.989

3 PARAMETER LOGNORMAL WITH CENSORING

PARAMETERS A = 130.3368 M = 4.3[illegible]45 S = .7255

MEAN = 235. SD = 87. CS = 3.075 CK = 23.544

UPPER LIMIT X = 145.2750
LOWER LIMIT X = -3.7250

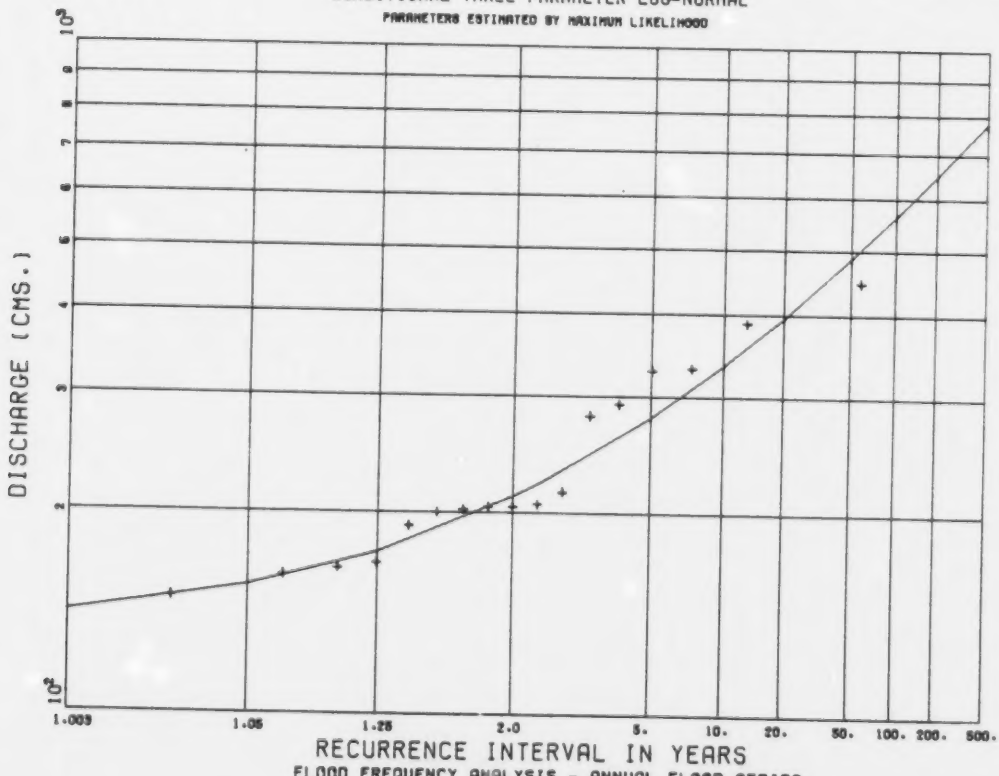
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	.997	141.
1.050	.952	155.
1.250	.800	174.
2.000	.500	211.
2.330	.429	222.
5.000	.200	278.
10.000	.100	334.
20.000	.050	395.
50.000	.020	487.
100.000	.010	564.
200.000	.005	650.
500.000	.002	779.

GRAND RIVER NEAR MARSVILLE 02GA014

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I130.0

GREEN WATER CREEK AT OUTLET OF GREENWATER LAKE 02AB012

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

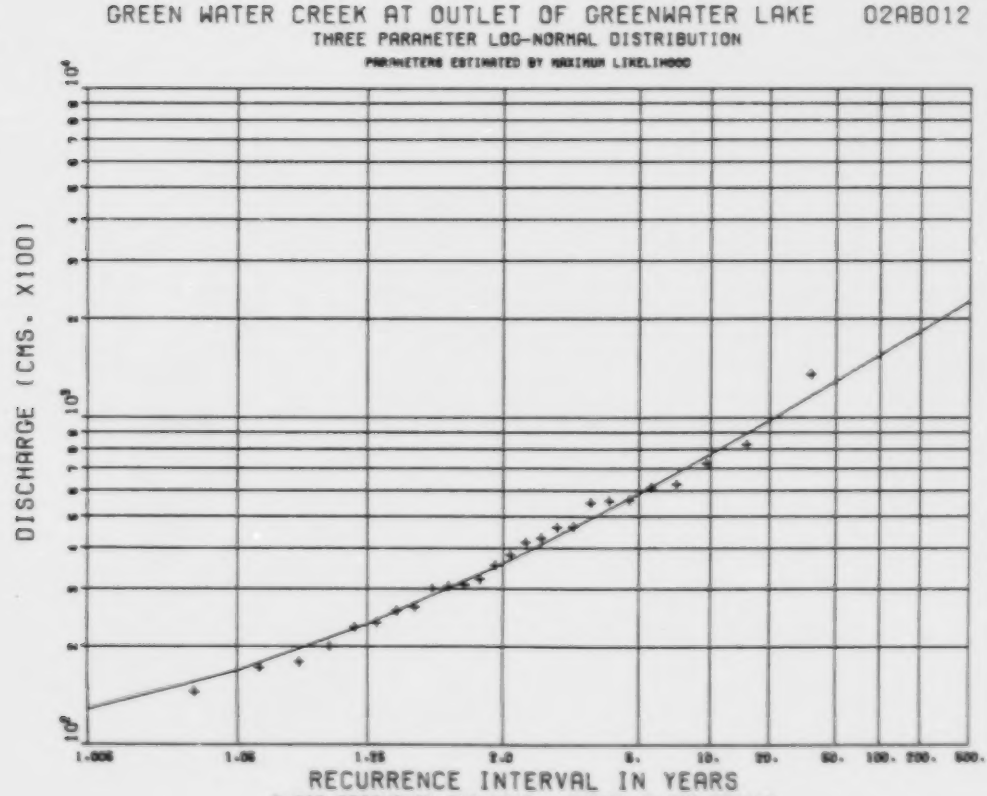
DRAINAGE AREA : 174.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1952 - 1977

SAMPLE STATISTICS
MEAN = 432. S.D. = 255.8 C.S. = 1.9437 C.K. = 8.7549
SAMPLE STATISTICS (LOGS)
MEAN = 5.9262 S.D. = .5340 C.S. = .2965 C.K. = 3.3126
SAMPLE MIN = 145. SAMPLE MAX = 1355. N = 26

PARAMETERS FOR GUMBEL I A = .006037 U = 327.
PARAMETERS FOR LOGNORMAL P = 5.9262 S = .5340
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 85. M = 5.6106 S = .7284
STATISTICS OF LOG(X-A)
MEAN = 5.6106 S.D. = .7284 C.S. = -.1259 C.K. = 3.2040
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0792 B = .4551E+02 LOG(M) = 2.3240
ME= .1822E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1178 B = .2002E+02
LOG(M)F= 3.5676 M = .3543E+02
DISTRIBUTION STATISTICS MEAN = 5.9262 S.D. = .5272 C.S. = .4470

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	51.		95.		128.		126.		117.	
1.050	143.		156.		168.		169.		163.	
1.250	249.		232.		234.		234.		228.	
2.000	388.		375.		358.		368.		365.	
2.330	423.	9.74	412.	10.60	396.	11.60	396.	11.20	402.	11.50
5.000	576.	10.20	587.	12.20	586.	14.10	575.	13.50	582.	13.20
10.000	700.	10.70	743.	14.10	773.	17.40	751.	17.00	754.	16.30
20.000	819.	11.20	902.	16.10	979.	21.20	948.	21.60	941.	20.80
50.000	974.	11.70	1120.	18.50	1290.	26.20	1250.	28.60	1220.	27.90
100.000	1090.	12.10	1308.	20.20	1550.	29.90	1520.	36.40	1462.	33.80
200.000	1200.	12.50	1480.	21.80	1810.	33.60	1820.	40.60	1720.	40.10
500.000	1360.	12.80	1740.	23.80	2260.	38.00	2290.	49.10	2120.	49.90

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I131.0

GRINDSTONE CREEK NEAR ALDERSHOT 02HB012

DRAINAGE AREA = 82.6 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1972 - 1982

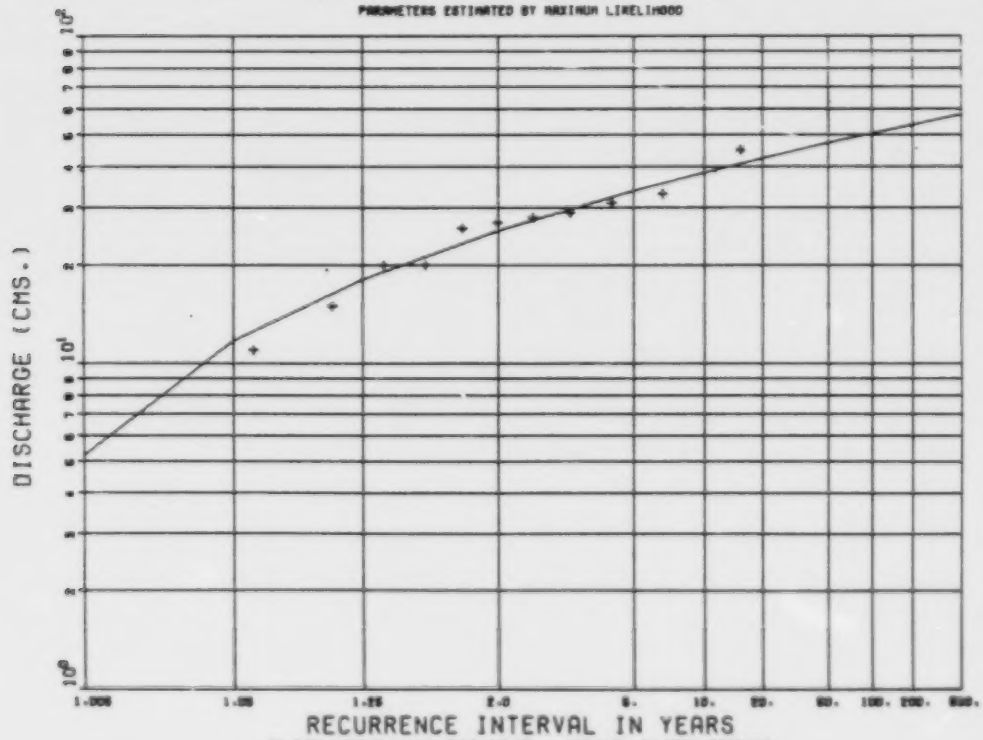
SAMPLE STATISTICS
MEAN = 26. S.D. = 9.3 C.S. = .3727 C.K. = 4.9315
SAMPLE STATISTICS (LOGS)
MEAN = 3.1898 S.D. = .3920 C.S. = -.6799 C.K. = 4.7277
SAMPLE MIN = 11. SAMPLE MAX = 45. N = 11

PARAMETERS FOR GUMBEL I A = .124863 U = 22.
PARAMETERS FOR LOGNORMAL P = 3.1898 S = .3920
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -45. M = 4.2494 S = .1316
STATISTICS OF LOG(X-A)
MEAN = 4.2494 S.D. = .1316 C.S. = -.8152 C.K. = 4.5172
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1332 B = .8654E+01 LOG(M) = 4.3429
ME= .7693E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1389 B = .8226E+01
LOG(M)= 4.2663 M = .7126E+02
DISTRIBUTION STATISTICS MEAN = 3.1898 S.D. = .3753 C.S. = -.6973

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	8.		9.		5.		7.		7.	
1.050	13.		13.		12.		12.		12.	
1.250	18.		18.		18.		18.		18.	
2.000	25.		24.		25.		25.		25.	
2.330	26.	11.70	26.	11.90	27.	11.40	27.	11.30	27.	12.80
5.000	34.	13.00	34.	13.80	34.	10.80	34.	10.60	34.	11.20
10.000	40.	14.10	40.	16.00	38.	11.90	38.	10.70	39.	11.80
20.000	45.	15.10	46.	18.10	42.	13.80	42.	11.50	43.	14.60
50.000	53.	16.10	54.	20.80	47.	16.80	45.	13.60	47.	20.20
100.000	58.	16.70	60.	22.70	50.	19.20	48.	15.60	50.	25.10
200.000	64.	17.20	67.	24.60	54.	21.60	50.	18.00	52.	30.10
500.000	71.	17.90	75.	26.80	58.	24.90	53.	21.20	55.	36.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GRINDSTONE CREEK NEAR ALDERSHOT 02HB012
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1 I132.0

GROUNDHOG RIVER AT FAUQUIER 04LD001

DRAINAGE AREA = 11988.8 SQ. KM.
REGULATED FLOW = CLASS 2
PERIOD OF RECORD = 1921 - 1982

SAMPLE STATISTICS
MEAN = 965. S.D. = 295.9 C.S. = .7142 C.K. = 3.5626
SAMPLE STATISTICS (LOGS)
MEAN = 6.8264 S.D. = .3061 C.S. = -.1083 C.K. = 3.1482
SAMPLE MIN = 426. SAMPLE MAX = 1834. N = 62

PARAMETERS FOR GUMBEL I A = .884120 U = 828.
PARAMETERS FOR LOGNORMAL M = 6.8264 S = .3061
PARAMETERS FOR THREE PARAPETER LOGNORMAL A = -185. M = 6.9387 S = .2734
STATISTICS OF LOG(X-A)
MEAN = 6.9387 S.D. = .2734 C.S. = -.0135 C.K. = 3.0692
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0166 B = .3488E+03 LOG(M) =12.4770
ME= .2622E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0140 B = .2838E+03
LOG(M)= 11.9345 M = .1524E+06
DISTRIBUTION STATISTICS MEAN = 6.8264 S.D. = .3038 C.S. = -.1189

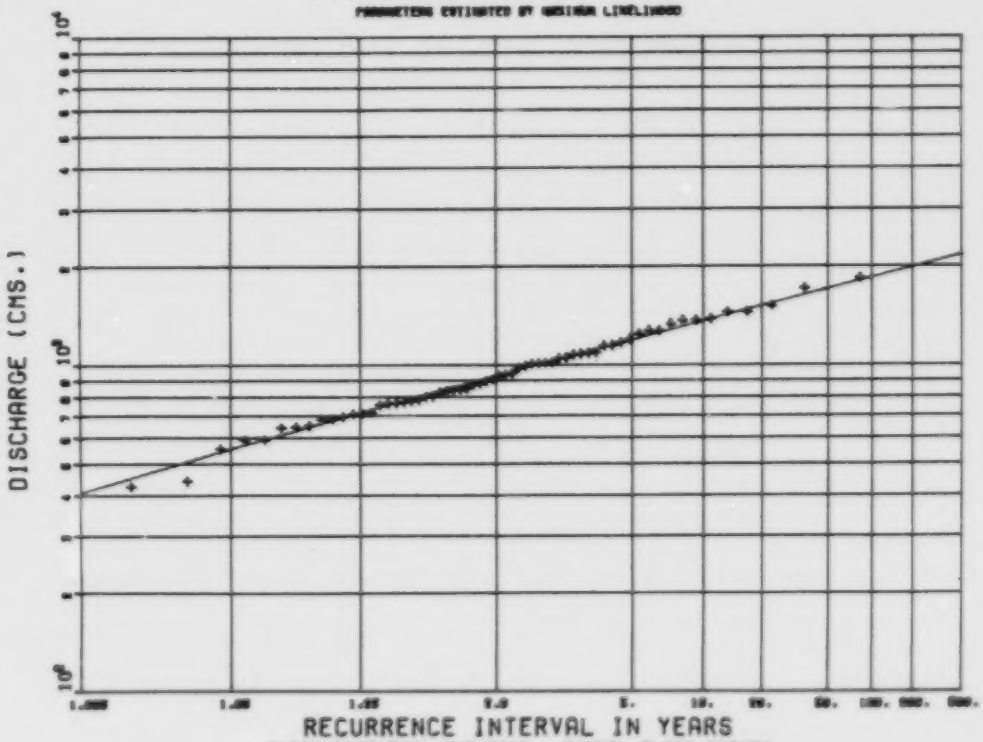
	GUMBEL I		LOGNORPAL		THREE PARAPETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.010	423.		419.		405.		408.		406.	
1.050	558.		557.		551.		554.		552.	
1.250	712.		712.		714.		715.		714.	
2.000	917.		922.		926.		927.		927.	
2.330	966.	4.04	973.	3.92	978.	4.12	979.	4.15	979.	4.19
5.000	1190.	4.66	1198.	4.52	1190.	4.48	1190.	4.37	1190.	4.42
10.000	1370.	5.19	1360.	5.25	1360.	5.18	1358.	5.02	1360.	5.09
20.000	1550.	5.63	1538.	5.96	1519.	6.24	1520.	6.36	1518.	6.16
50.000	1780.	6.11	1738.	6.85	1700.	7.85	1698.	7.84	1700.	8.01
100.000	1940.	6.41	1880.	7.48	1840.	9.11	1828.	9.37	1830.	9.58
200.000	2110.	6.67	2038.	8.08	1980.	10.40	1958.	11.00	1970.	11.30
500.000	2348.	6.95	2238.	8.82	2168.	12.10	2128.	13.30	2140.	13.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

GROUNDHOG RIVER AT FAUQUIER 04LD001

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1133.0

GROUNDHOG RIVER AT HORWOOD LAKE 04LC001

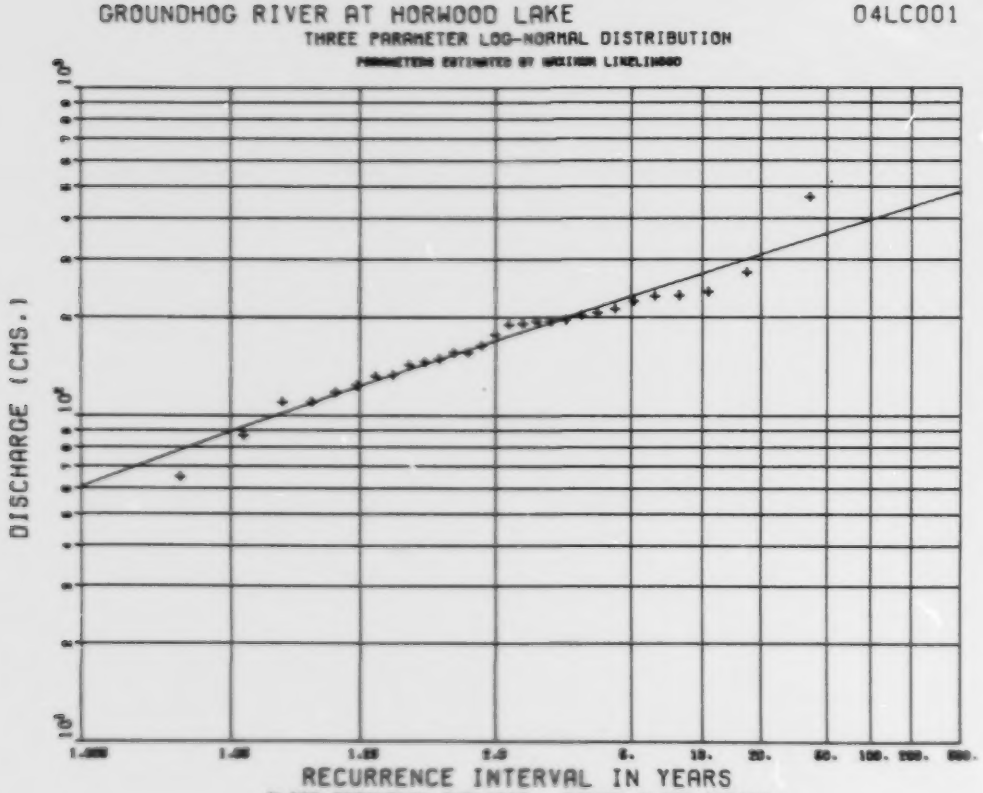
DRAINAGE AREA = 3370.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1933 - 1961

SAMPLE STATISTICS
MEAN = 180. S.D. = 73.6 C.S. = 1.9787 C.K. = 10.4841
SAMPLE STATISTICS (LOGS)
MEAN = 5.1237 S.D. = .3788 C.S. = -.8382 C.K. = 4.8854
SAMPLE MIN = 65. SAMPLE MAX = 464. N = 29

PARAMETERS FOR GUMBEL I A = .818749 U = 150.
PARAMETERS FOR LOGNORMAL M = 5.1237 S = .3788
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -15. M = 5.2167 S = .3447
STATISTICS OF LOG(X-A)
MEAN = 5.2167 S.D. = .3447 C.S. = .1151 C.K. = 4.9328
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0072 B = .2735E+04 LOG(M) =24.9333
ME= .6736E+11
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0037 B = .1013E+05
LOG(M)F=42.5759 M = .3094E+19
DISTRIBUTION STATISTICS MEAN = 5.1237 S.D. = .3722 C.S. = -.0199

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	61.		63.		61.		64.		63.	
1.050	97.		98.		89.		91.		90.	
1.250	124.		122.		123.		123.		122.	
2.000	169.		168.		169.		168.		168.	
2.330	180.	6.97	180.	7.89	181.	7.41	180.	7.48	180.	7.68
5.000	230.	7.78	231.	8.19	231.	7.95	230.	8.04	231.	8.14
10.000	270.	8.49	273.	9.49	271.	9.38	270.	9.42	272.	9.51
20.000	308.	9.10	313.	10.88	310.	11.38	309.	11.50	312.	11.60
50.000	358.	9.74	366.	12.48	359.	14.10	359.	15.00	363.	15.10
100.000	395.	10.10	405.	13.50	396.	16.20	397.	18.00	401.	18.10
200.000	432.	10.50	446.	14.60	433.	18.40	435.	21.10	440.	21.30
500.000	481.	10.90	500.	16.00	482.	21.30	486.	25.50	491.	25.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I134.0

GULL RIVER AT NORLAND 02HF002

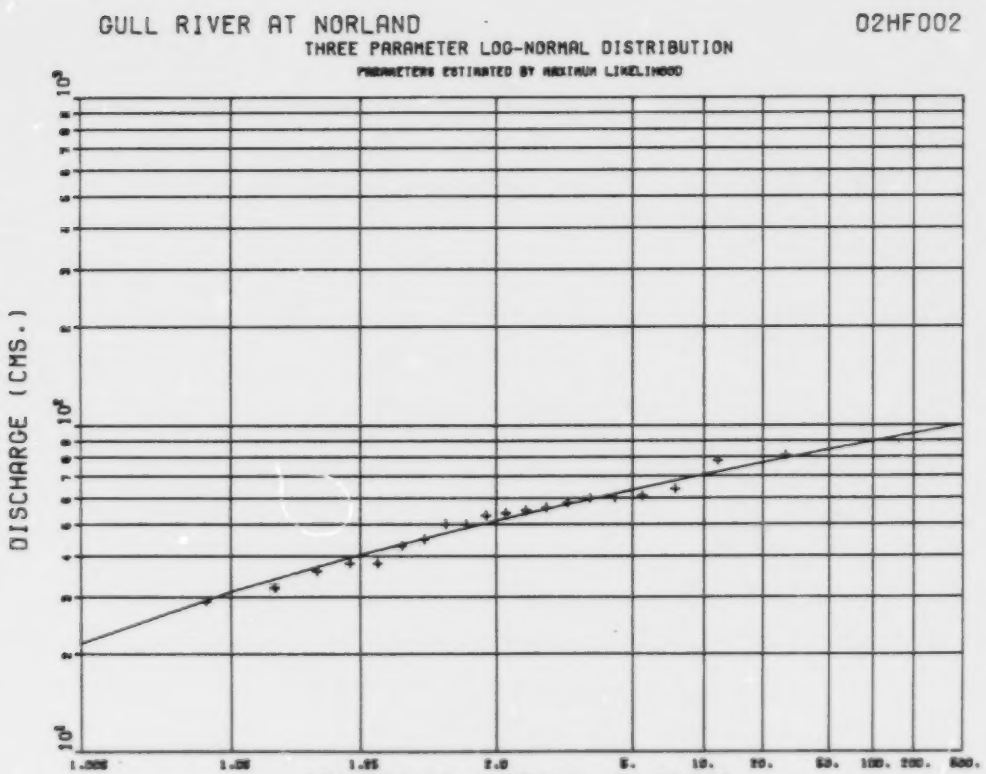
DRAINAGE AREA : 1280.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1963 - 1982

SAMPLE STATISTICS
MEAN = 52. S.D. = 13.9 C.S. = .3156 C.K. = 3.5014
SAMPLE STATISTICS (LOGS)
MEAN = 3.9173 S.D. = .2752 C.S. = -.3176 C.K. = 3.2142
SAMPLE MIN = 29. SAMPLE MAX = 81. N = 20

PARAMETERS FOR GUMBEL I A = .093010 U = 45.
PARAMETERS FOR LOGNORMAL P = 3.9173 S = .2752
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -45. M = 4.5658 S = .1428
STATISTICS OF LOG(X-A)
MEAN = 4.5658 S.D. = .1428 C.S. = -.0278 C.K. = 3.2178
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0437 B = .3966E+02 LOG(M) = 5.6501
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .2843E+03
A = -.0617 B = .1911E+02
LOG(M)F= 5.0965 M = .1635E+03
DISTRIBUTION STATISTICS MEAN = 3.9173 S.D. = .2697 C.S. = -.4575

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	25.		25.		22.		22.		23.	
1.050	32.		32.		31.		31.		31.	
1.250	40.		40.		40.		40.		40.	
2.000	50.		50.		51.		51.		51.	
2.330	52.	6.52	53.	6.20	54.	6.33	53.	6.27	54.	6.61
5.000	64.	7.64	63.	7.16	63.	6.37	63.	6.15	64.	6.58
10.000	73.	8.58	72.	8.30	70.	7.23	70.	6.57	71.	7.28
20.000	81.	9.38	79.	9.44	77.	8.55	75.	7.51	77.	8.71
50.000	93.	10.20	88.	10.80	84.	10.50	82.	9.33	84.	11.40
100.000	101.	10.80	95.	11.80	89.	12.00	86.	11.00	89.	13.70
200.000	109.	11.30	102.	12.80	94.	14.00	90.	12.80	94.	16.20
500.000	120.	11.80	111.	14.00	100.	16.30	95.	15.30	100.	19.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I135.0

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

HIGHLAND CREEK NEAR WEST HILL 02HC013

DRAINAGE AREA 68.1 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1958 - 1980

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	39.	34.	2.548	11.688
LN X SERIES	3.42	.74	.062	4.340
LN (X-A) SERIES	3.41	.74	.055	4.340

3 PARAMETER LOGNORMAL WITH CENSORING

PARAMETERS A = .0745 M = 3.4016 S = .7327

MEAN = 38. SD = 31. CS = 2.907 CK = 21.353

UPPER LIMIT X = 6.8250
LOWER LIMIT X = -.1750

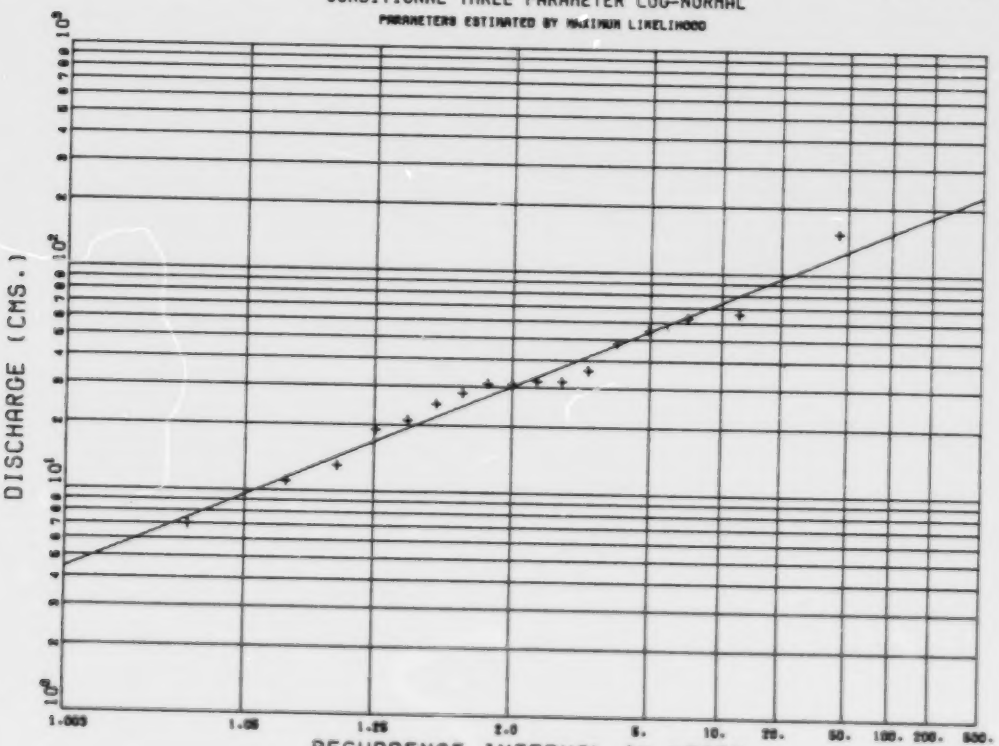
FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	.997	4.
1.050	.952	10.
1.250	.800	17.
2.000	.500	30.
2.330	.429	34.
5.000	.200	54.
10.000	.100	74.
20.000	.050	95.
50.000	.020	127.
100.000	.010	154.
200.000	.005	183.
500.000	.002	227.

HIGHLAND CREEK NEAR WEST HILL 02HC013

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I136.0

HOLLAND RIVER AT HOLLAND LANDING 02EC009

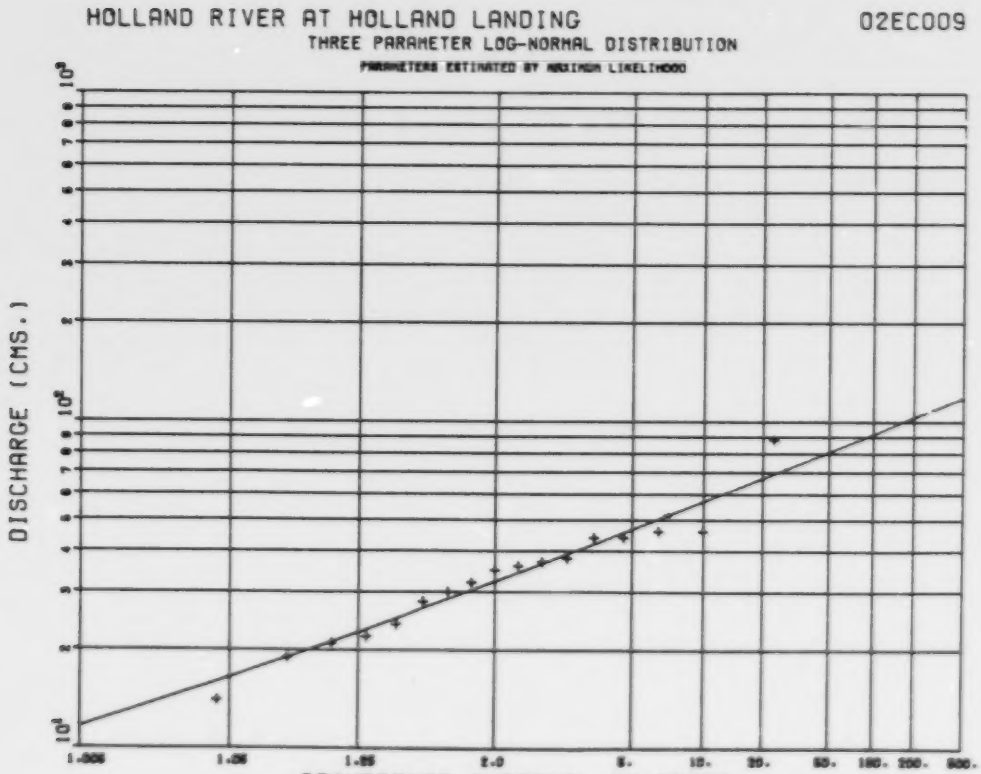
DRAINAGE AREA = 181.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 36. S.D. = 16.7 C.S. = 1.8963 C.K. = 9.2634
SAMPLE STATISTICS (LOGS)
MEAN = 3.4816 S.D. = .4283 C.S. = .1857 C.K. = 4.5618
SAMPLE MIN = 14. SAMPLE MAX = 88. N = 17

PARAMETERS FOR GUMBEL I A = .088139 U = 29.
PARAMETERS FOR LOGNORMAL M = 3.4816 S = .4283
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 3.3706 S = .4778
STATISTICS OF LOG(X-A)
MEAN = 3.3706 S.D. = .4778 C.S. = .0205 C.K. = 4.4676
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0398 B = .1160E+03 LOG(M) =-1.1324
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3222E+00
A = .0362 B = .1892E+03
LOG(M)F=-2.2321 M = .1073E+00
DISTRIBUTION STATISTICS MEAN = 3.4816 S.D. = .4154 C.S. = .1454

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	10.		11.		12.		12.		12.	
1.050	16.		16.		16.		17.		16.	
1.250	23.		23.		23.		23.		23.	
2.000	33.		33.		32.		32.		32.	
2.330	35.	9.90	35.	10.50	35.	11.20	35.	11.00	35.	11.40
5.000	46.	10.80	47.	12.10	47.	12.60	46.	12.20	46.	12.70
10.000	54.	11.70	56.	14.00	57.	15.20	56.	14.80	57.	15.50
20.000	62.	12.50	66.	15.90	67.	18.40	66.	18.30	67.	19.40
50.000	73.	13.30	78.	18.30	81.	23.00	79.	24.10	82.	25.70
100.000	81.	13.70	88.	20.00	92.	26.50	89.	29.00	93.	31.00
200.000	89.	14.20	98.	21.60	103.	29.80	100.	34.10	106.	36.70
500.000	99.	14.60	112.	23.60	118.	34.40	116.	41.30	123.	44.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I137.0

HORNER CREEK NEAR PRINCETON 02GB006

DRAINAGE AREA : 138.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1954 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	37.	15.	1.109	4.627
LN X SERIES	3.52	.40	-1.331	7.971

X(MIN)= 6. CMS. TOTAL SAMPLE SIZE= 29
X(MAX)= 78. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	38.	15.	1.116	4.775
LN X SERIES	3.58	.38	-.138	3.534
LN (X-A) SERIES	3.44	.43	-.016	3.617

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 4.1949 M = 3.4437 S = .4293

FLOOD FREQUENCY REGIME

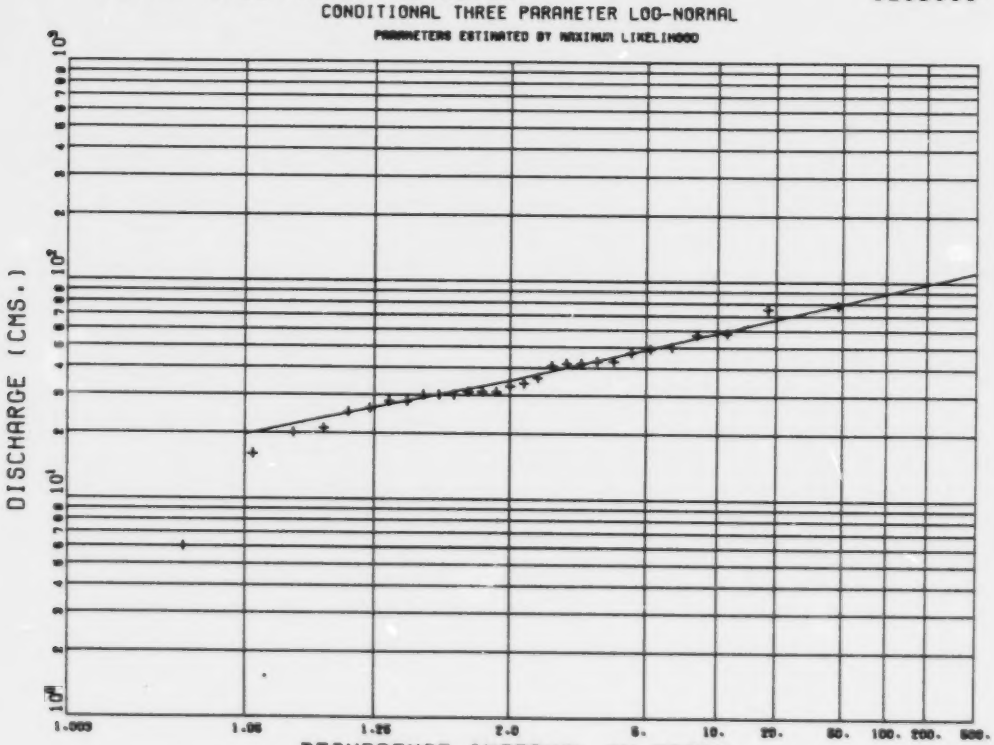
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	20.
1.250	.800	26.
2.000	.500	35.
2.330	.429	37.
5.000	.200	49.
10.000	.100	58.
20.000	.050	67.
50.000	.020	79.
100.000	.010	89.
200.000	.005	98.
500.000	.002	111.

HORNER CREEK NEAR PRINCETON 02GB006

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I138.0

HUMBER RIVER AT ELDER MILLS 02HC025

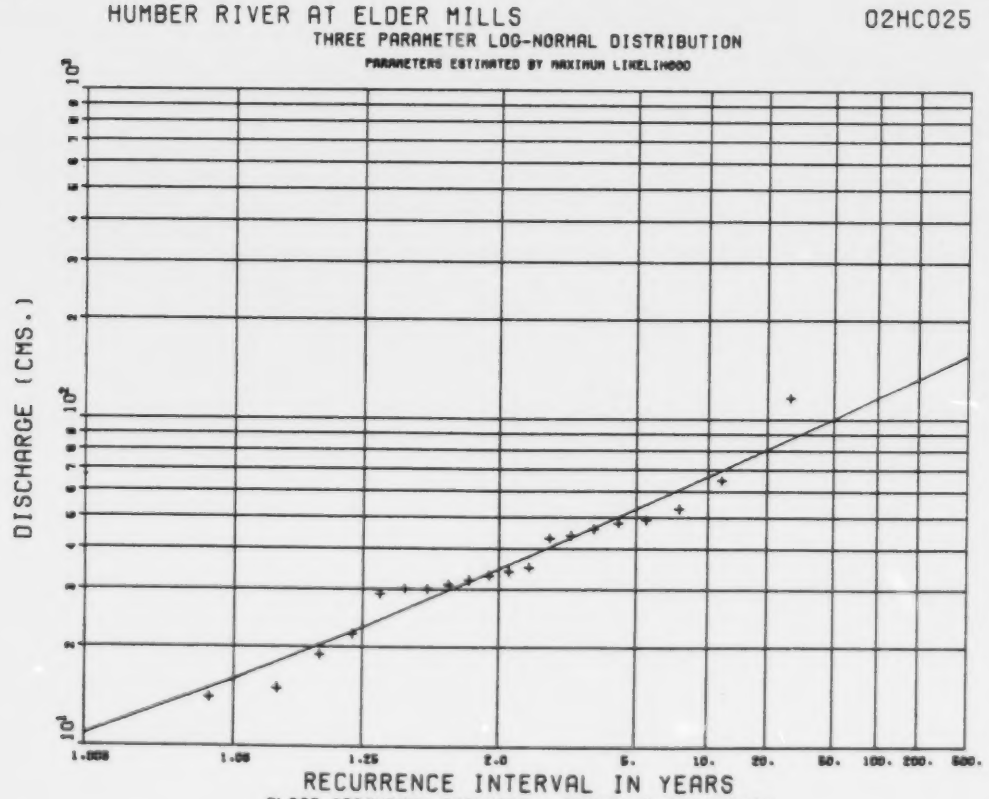
DRAINAGE AREA = 303.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1963 - 1982

SAMPLE STATISTICS
MEAN = 39. S.D. = 22.3 C.S. = 2.2374 C.K. = 10.5954
SAMPLE STATISTICS (LOGS)
MEAN = 3.5533 S.D. = .4936 C.S. = .2169 C.K. = 4.4812
SAMPLE MIN = 14. SAMPLE MAX = 116. N = 20

PARAMETERS FOR GUMBEL I A = .071191 U = 31.
PARAMETERS FOR LOGNORMAL M = 3.5533 S = .4936
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 3.4398 S = .5517
STATISTICS OF LOG(X-A)
MEAN = 3.4398 S.D. = .5517 C.S. = .0243 C.K. = 4.3422
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0535 B = .8501E+02 LOG(M) = -.9979
ME= .3606E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0396 B = .1473E+03
LOG(M)F=-2.2836 M = .1019E+00
DISTRIBUTION STATISTICS MEAN = 3.5533 S.D. = .4809 C.S. = .1648

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	7.		10.		11.		11.		11.	
1.050	15.		16.		16.		16.		16.	
1.250	24.		23.		23.		23.		23.	
2.000	36.		35.		35.		35.		34.	
2.330	39.	10.30	38.	11.10	38.	11.90	38.	11.70	38.	12.10
5.000	52.	10.90	53.	12.80	53.	13.50	52.	13.10	53.	13.60
10.000	62.	11.70	66.	14.90	67.	16.20	65.	15.90	66.	16.70
20.000	72.	12.30	79.	16.90	81.	19.60	79.	19.80	81.	21.00
50.000	86.	12.90	96.	19.50	100.	24.30	98.	26.00	102.	27.90
100.000	95.	13.30	110.	21.20	116.	27.90	113.	31.30	119.	33.70
200.000	105.	13.70	125.	22.90	132.	31.30	130.	36.80	138.	39.90
500.000	118.	14.00	145.	25.00	156.	35.80	154.	44.50	165.	48.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I139.0

HUMBER RIVER AT WESTON 02HC003

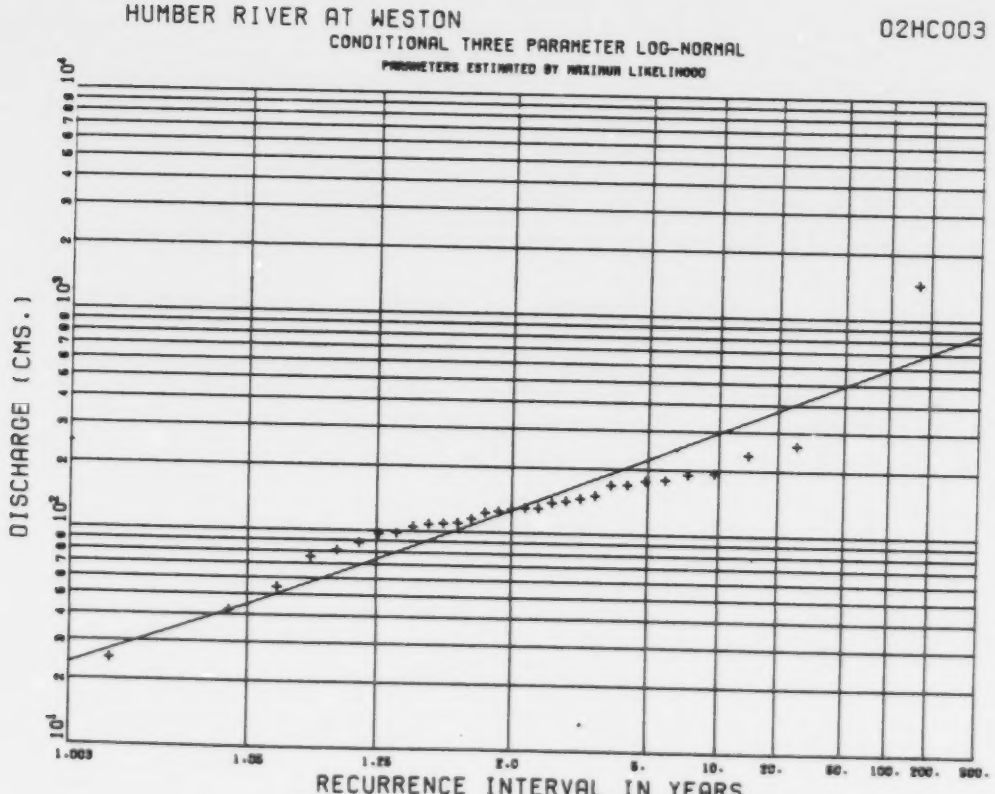
DRAINAGE AREA : 800.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1952 - 1982

SAMPLE STATISTICS
MEAN = 172. S.D. = 242.5 C.S. = 5.1712 C.K. = 31.2937
SAMPLE STATISTICS (LOGS)
MEAN = 4.8478 S.D. = .6603 C.S. = 1.0576 C.K. = 9.5709
SAMPLE MIN = 25. SAMPLE MAX = 1449. N = 31

PARAMETERS FOR GUMBEL I A = .013415 U = 115.
PARAMETERS FOR LOGNORMAL M = 4.8478 S = .6603
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 4.7990 S = .6920
STATISTICS OF LOG(X-A)
MEAN = 4.7990 S.D. = .6920 C.S. = .8114 C.K. = 9.1480
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .3492 B = .3576E+01 LOG(M) = 3.5992
ME= .3657E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0844 B = .5734E+02
LOG(P)F= .8063 M = .1006E+01
DISTRIBUTION STATISTICS MEAN = 4.8478 S.D. = .6393 C.S. = .2641

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-9.		23.		25.		29.		0.	
1.051	33.		43.		44.		47.		0.	
1.250	80.		73.		73.		74.		0.	
2.003	143.		127.		126.		124.		0.	
2.330	159.	18.70	143.	12.80	142.	12.50	139.	12.50	0.	0.00
5.000	227.	10.60	222.	13.80	222.	14.10	216.	14.30	0.	0.00
10.000	283.	10.90	297.	16.00	300.	17.00	294.	17.60	0.	0.00
20.000	337.	11.20	378.	18.20	384.	20.20	382.	22.10	0.	0.00
50.000	406.	11.60	495.	20.90	509.	24.60	518.	29.20	0.	0.00
100.000	458.	11.80	592.	22.80	612.	27.80	638.	35.20	0.	0.00
200.000	516.	12.00	698.	24.60	727.	30.90	776.	41.40	0.	0.00
500.000	579.	12.20	854.	26.90	896.	34.50	989.	50.10	0.	0.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I140.0

HUMBER RIVER NEAR CEDAR MILLS 02HC012

DRAINAGE AREA : 169.0 SQ. KM.
REGULATED FLOW : CLASS1
PERIOD OF RECORD : 1957 - 1981

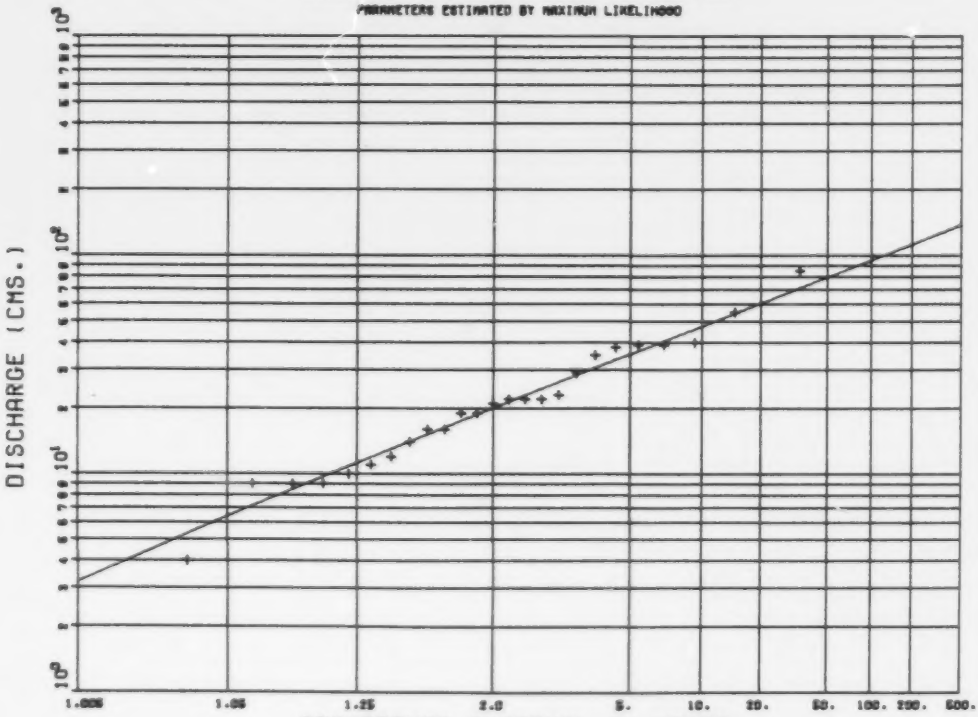
SAMPLE STATISTICS
MEAN = 25. S.D. = 17.8 C.S. = 1.8342 C.K. = 7.8590
SAMPLE STATISTICS (LOGS)
MEAN = 2.9886 S.D. = .6842 C.S. = -.1112 C.K. = 3.5907
SAMPLE MIN = 4. SAMPLE MAX = 85. N = 25

PARAMETERS FOR GUMBEL I A = .088466 U = 18.
PARAMETERS FOR LOGNORMAL M = 2.9886 S = .6842
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 3.0228 S = .6609
STATISTICS OF LOG(X-A)
MEAN = 3.0228 S.D. = .6609 C.S. = -.0324 C.K. = 3.5155
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8346 B = .3909E+03 LOG(M) =16.5158
ME= .1486E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0348 B = .3704E+03
LOG(M)F=15.8909 M = .7968E+07
DISTRIBUTION STATISTICS MEAN = 2.9886 S.D. = .6704 C.S. = -.1039

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-1.		3.		3.		3.		3.	
1.050	5.		6.		6.		6.		6.	
1.250	12.		11.		11.		11.		11.	
2.000	22.		20.		20.		20.		20.	
2.333	24.	11.90	22.	13.80	22.	14.20	23.	14.40	23.	14.80
5.000	35.	11.80	35.	15.90	35.	15.60	35.	15.20	35.	15.60
10.000	43.	12.20	48.	18.50	47.	18.60	47.	17.60	47.	18.00
20.000	51.	12.50	61.	21.00	60.	22.00	59.	24.30	60.	21.60
50.000	62.	12.90	81.	24.10	79.	26.70	76.	27.60	78.	28.30
100.000	70.	13.10	98.	26.30	95.	30.20	90.	32.90	93.	33.90
200.000	77.	13.40	116.	28.40	112.	33.50	105.	38.70	108.	39.80
500.000	88.	13.60	142.	31.00	137.	37.90	126.	46.70	131.	48.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

HUMBER RIVER NEAR CEDAR MILLS 02HC012
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I141.0

INDIAN RIVER NEAR BLAKENEY 02KF012

DRAINAGE AREA : 203.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

SAMPLE STATISTICS
MEAN = 29. S.D. = 7.5 C.S. = .0451 C.K. = 3.6832
SAMPLE STATISTICS (LOGS)
MEAN = 3.3419 S.D. = .2690 C.S. = -.4558 C.K. = 3.6681
SAMPLE MIN = 18. SAMPLE MAX = 41. N = 11

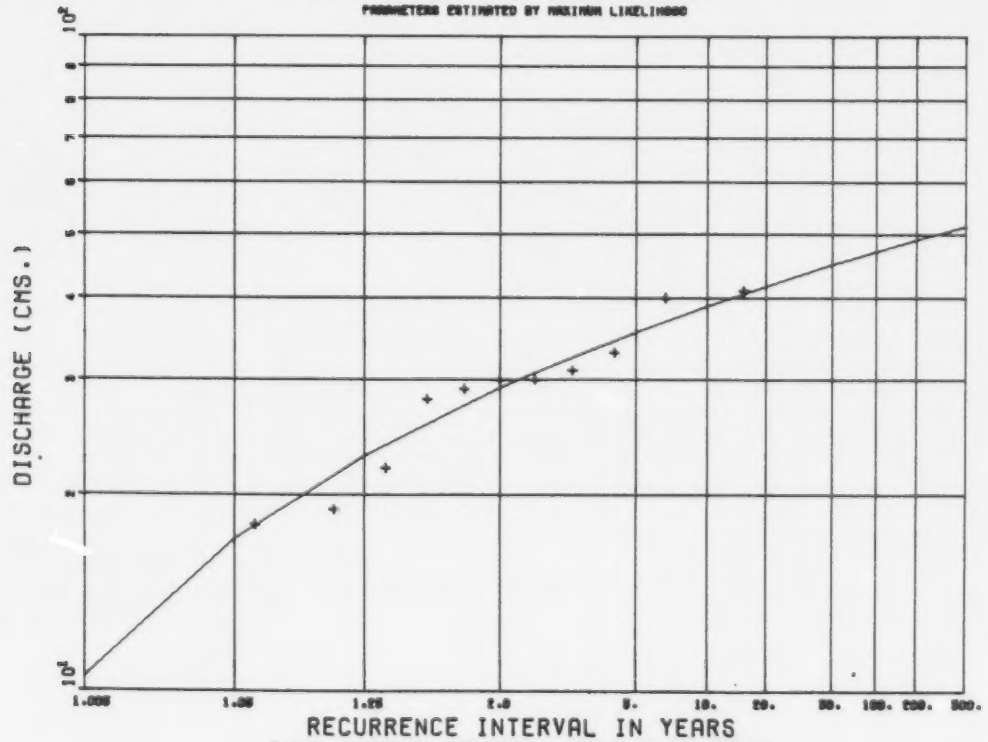
PARAMETERS FOR GUMBEL I A = .152563 U = 26.
PARAMETERS FOR LOGNORMAL P = 3.3419 S = .2690
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -253. M = 5.6430 S = .0264
STATISTICS OF LOG(X-A)
MEAN = 5.6430 S.D. = .0264 C.S. = -.0079 C.K. = 3.6638
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0613 B = .1926E+02 LOG(M) = 4.5222
ME= .9204E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	15.		14.		11.		0.		13.	
1.050	18.		18.		17.		0.		16.	
1.250	23.		23.		23.		0.		21.	
2.000	28.		28.		29.		0.		26.	
2.330	29.	8.52	30.	8.17	30.	8.04	0.	0.00	30.	8.71
5.000	36.	10.00	36.	9.44	35.	7.59	0.	0.00	36.	8.30
10.000	40.	11.30	40.	10.90	39.	8.25	0.	0.00	40.	8.97
20.000	45.	12.40	44.	12.40	42.	9.51	0.	0.00	42.	10.80
50.000	51.	13.60	49.	14.30	45.	11.60	0.	0.00	46.	14.20
100.000	56.	14.30	53.	15.60	47.	13.40	0.	0.00	48.	17.30
200.000	60.	15.00	57.	16.90	49.	15.10	0.	0.00	51.	20.60
500.000	66.	15.70	61.	18.40	51.	17.50	0.	0.00	53.	25.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

INDIAN RIVER NEAR BLAKENEY 02KF012
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1142.0

INDIAN RIVER NEAR PEMBROKE 02KC014

DRAINAGE AREA = 443.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1969 - 1982

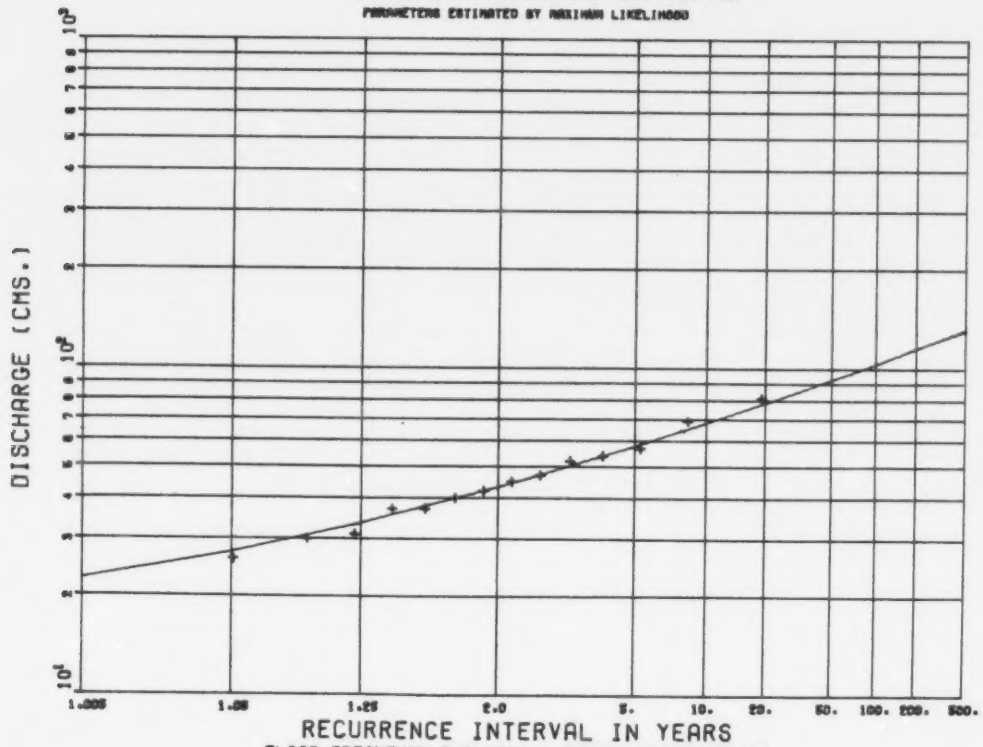
SAMPLE STATISTICS
MEAN = 46. S.D. = 15.4 C.S. = .9218 C.K. = 4.4899
SAMPLE STATISTICS (LOGS)
MEAN = 3.7865 S.D. = .3203 C.S. = .2296 C.K. = 3.4985
SAMPLE MIN = 26. SAMPLE MAX = 81. N = 14

PARAMETERS FOR GUMBEL I A = .097555 U = 40.
PARAMETERS FOR LOGNORMAL P = 3.7865 S = .3203
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 14. M = 3.3614 S = .4847
STATISTICS OF LOG(X-A)
MEAN = 3.3614 S.D. = .4847 C.S. = -.1188 C.K. = 3.4932
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8368 B = .7586E+02 LOG(P) = .9961
ME= .2708E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0654 B = .2265E+02
LOG(M)F= 2.3060 M = .1003E+02
DISTRIBUTION STATISTICS MEAN = 3.7865 S.D. = .3111 C.S. = .4202

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	21.		19.		23.		22.		21.	
1.050	27.		26.		27.		28.		27.	
1.250	34.		34.		33.		34.		34.	
2.000	44.		44.		43.		43.		44.	
2.330	46.	8.40	47.	8.63	46.	9.44	46.	9.62	46.	9.39
5.000	57.	9.71	58.	9.96	55.	11.40	57.	10.80	58.	10.60
10.000	65.	10.80	67.	11.60	68.	14.20	66.	13.50	67.	13.00
20.000	73.	11.80	75.	13.10	78.	17.70	76.	17.10	76.	16.40
50.000	84.	12.80	85.	15.10	92.	22.60	89.	24.70	88.	21.80
100.000	92.	13.40	93.	16.50	103.	26.40	100.	27.40	98.	26.40
200.000	100.	13.90	101.	17.80	115.	30.20	111.	32.30	108.	31.20
500.000	110.	14.60	111.	19.40	131.	35.10	127.	39.00	121.	37.90

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT

INDIAN RIVER NEAR PEMBROKE 02KC014
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I143.0

JACKSONS CREEK AT PETERBOROUGH 02HJ001

DRAINAGE AREA = 110.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1963 - 1982

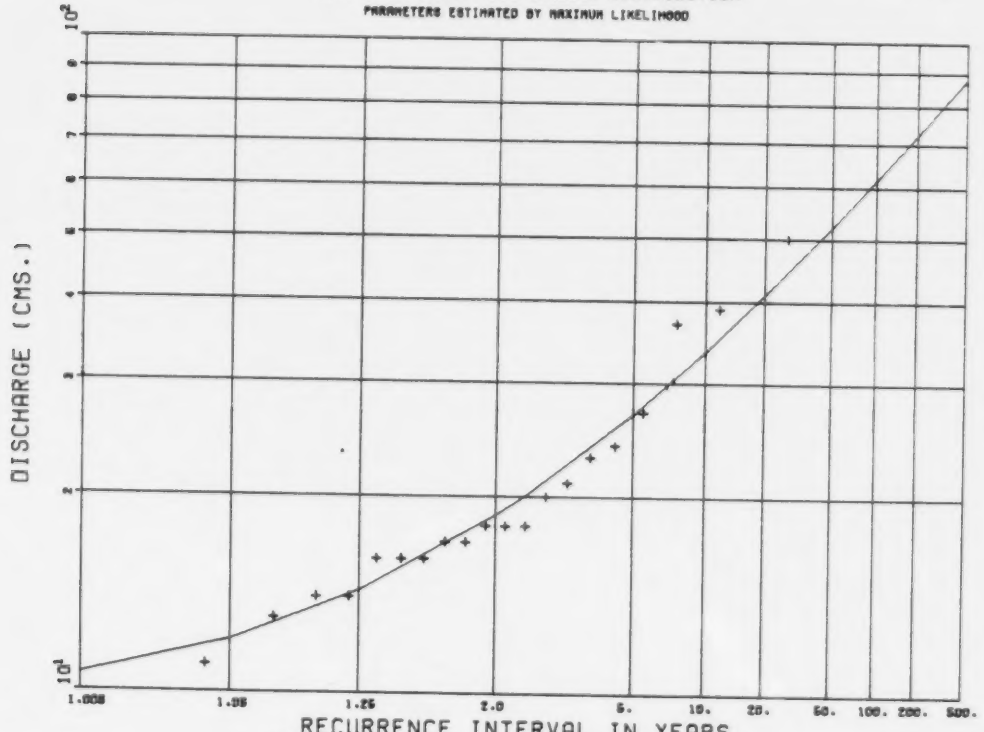
SAMPLE STATISTICS
MEAN = 21. S.D. = 9.9 C.S. = 1.7629 C.K. = 6.3552
SAMPLE STATISTICS (LOGS)
MEAN = 2.9866 S.D. = .3867 C.S. = .9953 C.K. = 4.1851
SAMPLE MIN = 11. SAMPLE MAX = 50. N = 20

PARAMETERS FOR GUMBEL I A = .172871 U = 18.
PARAMETERS FOR LOGNORMAL M = 2.9866 S = .3867
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 9. M = 2.2501 S = .7348
STATISTICS OF LOG(X-A)
MEAN = 2.2501 S.D. = .7348 C.S. = .0480 C.K. = 4.0327
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1524 B = .4038E+01 LOG(M) = 2.2096
ME= .9112E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1902 B = .3894E+01
LOG(M)E= 2.2459 M = .9449E+01
DISTRIBUTION STATISTICS MEAN = 2.9866 S.D. = .3754 C.S. = 1.0136

RETURN PERIOD	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	8.		7.		11.		11.		10.	
1.050	11.		11.		12.		12.		12.	
1.250	15.		14.		14.		14.		14.	
2.000	20.		20.		19.		19.		19.	
5.000	31.	7.89	31.	8.71	30.	9.27	30.	8.71	30.	10.50
10.000	36.	8.92	37.	10.10	37.	12.60	36.	12.10	37.	12.70
20.000	41.	9.81	43.	11.70	44.	16.60	43.	16.30	43.	17.00
50.000	45.	10.60	47.	13.30	51.	20.90	50.	21.00	51.	23.70
100.000	48.	11.40	50.	15.20	55.	26.00	55.	27.90	57.	35.00
200.000	51.	11.90	53.	16.60	62.	31.20	62.	33.50	64.	44.60
500.000	54.	12.30	54.	18.00	72.	35.50	74.	39.20	77.	55.00
	58.	12.80	60.	19.60	88.	41.00	94.	47.20	98.	69.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

JACKSONS CREEK AT PETERBOROUGH 02HJ001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : JJ44.0

JOCK RIVER NEAR RICHMOND 02LA007

DRAINAGE AREA : 559.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	115.	23.	-1.181	5.946
LN X SERIES	4.72	.26	-1.793	8.337

X(MIN)= 55. CMS. TOTAL SAMPLE SIZE= 14
X(MAX)= 148. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

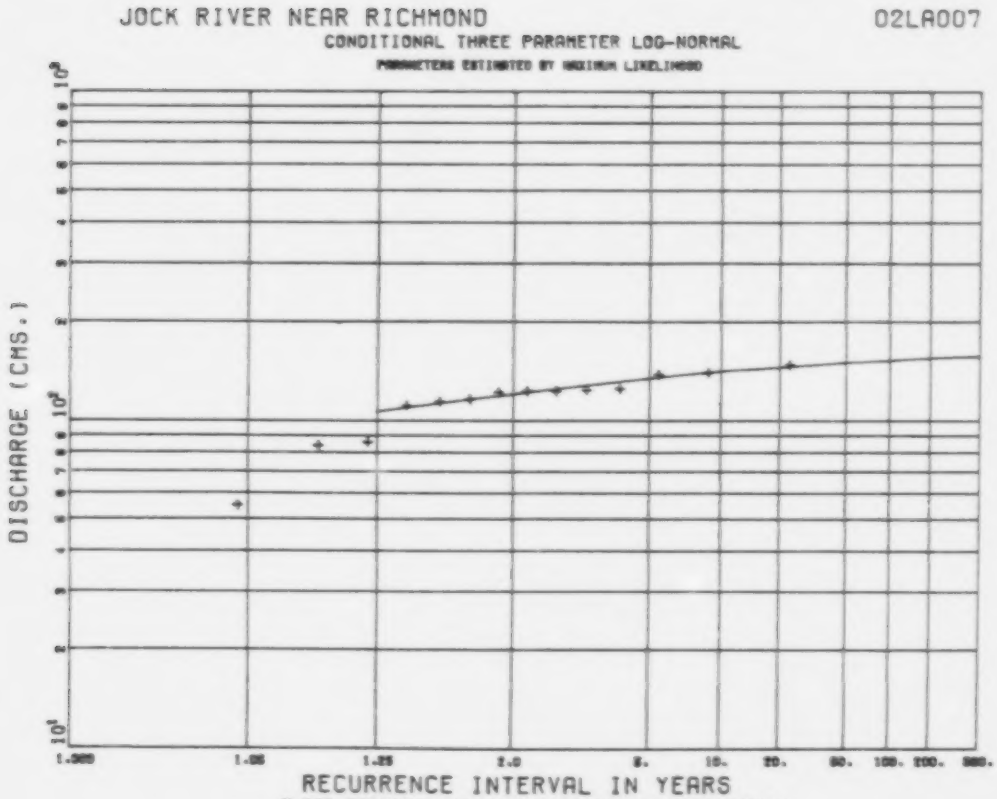
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	120.	19.	-.691	3.128
LN X SERIES	4.77	.19	-1.868	8.545
LN (X-A) SERIES	4.19	.27	-.838	4.718

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 107.7288 R = 4.1884 S = .2718

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	106.
2.000	.500	125.
2.330	.429	131.
5.000	.200	134.
10.000	.100	141.
20.000	.050	148.
50.000	.020	159.
100.000	.010	167.
200.000	.005	176.
500.000	.002	187.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I145.0

JUNCTION CREEK AT SUDBURY 02CF005

DRAINAGE AREA : 89.1 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1959 - 1982

SAMPLE STATISTICS
MEAN = 24. S.D. = 7.2 C.S. = .3663 C.K. = 2.5499
SAMPLE STATISTICS (LOGS)
MEAN = 3.1133 S.D. = .3105 C.S. = -.0821 C.K. = 2.4180
SAMPLE MIN = 13. SAMPLE MAX = 38. N = 24

PARAMETERS FOR GUMBEL I A = .159636 U = 20.
PARAMETERS FOR LOGNORMAL M = 3.1133 S = .3105
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 3.0199 S = .3408
STATISTICS OF LOG(X-A)
MEAN = 3.0199 S.D. = .3408 C.S. = -.1265 C.K. = 2.4362
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0127 B = .5936E+03 LOG(M) =10.6782
ME= .4340E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0577 B = .2832E+02
LOG(M)F= 4.7463 M = .1152E+03
DISTRIBUTION STATISTICS MEAN = 3.1133 S.D. = .3068 C.S. = -.3758

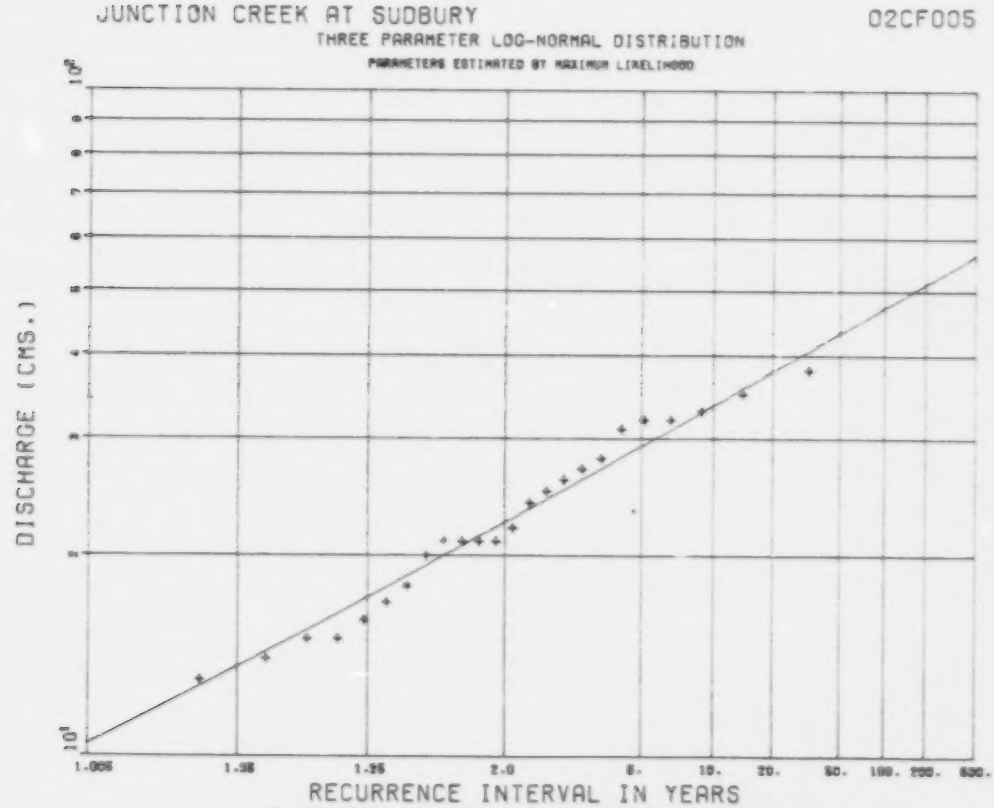
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	10.		10.		10.		9.		10.	
1.050	14.		14.		14.		13.		13.	
1.250	17.		17.		17.		18.		17.	
2.000	22.		23.		22.		23.		23.	
2.330	24.	6.48	24.	6.35	24.	6.83	24.	6.58	24.	6.84
5.000	29.	7.48	29.	7.38	29.	7.57	29.	6.56	29.	7.25
10.000	33.	8.32	34.	8.55	34.	9.10	33.	7.15	33.	9.40
20.000	38.	9.03	38.	9.72	38.	11.10	38.	8.29	37.	11.20
50.000	43.	9.81	43.	11.20	43.	14.00	40.	10.40	42.	13.30
100.000	47.	10.30	46.	12.20	47.	16.30	42.	12.30	46.	15.90
200.000	51.	10.70	50.	13.20	51.	18.60	45.	14.40	49.	18.70
500.000	57.	11.20	55.	14.40	57.	21.70	48.	17.30	53.	22.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

JUNCTION CREEK AT SUDBURY 02CF005

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I146.0

KABINAKAGAMI RIVER AT HIGHWAY NO. 11 04JA002

DRAINAGE AREA : 3788.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1951 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	230.	48.	.224	3.187
LN X SERIES	5.42	.23	-.393	3.681

X(MIN)= 124. CMS. TOTAL SAMPLE SIZE= 32
X(MAX)= 341. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	234.	47.	.428	3.515
LN X SERIES	5.43	.20	.049	2.732
LN (X-A) SERIES	5.15	.27	-.874	2.722

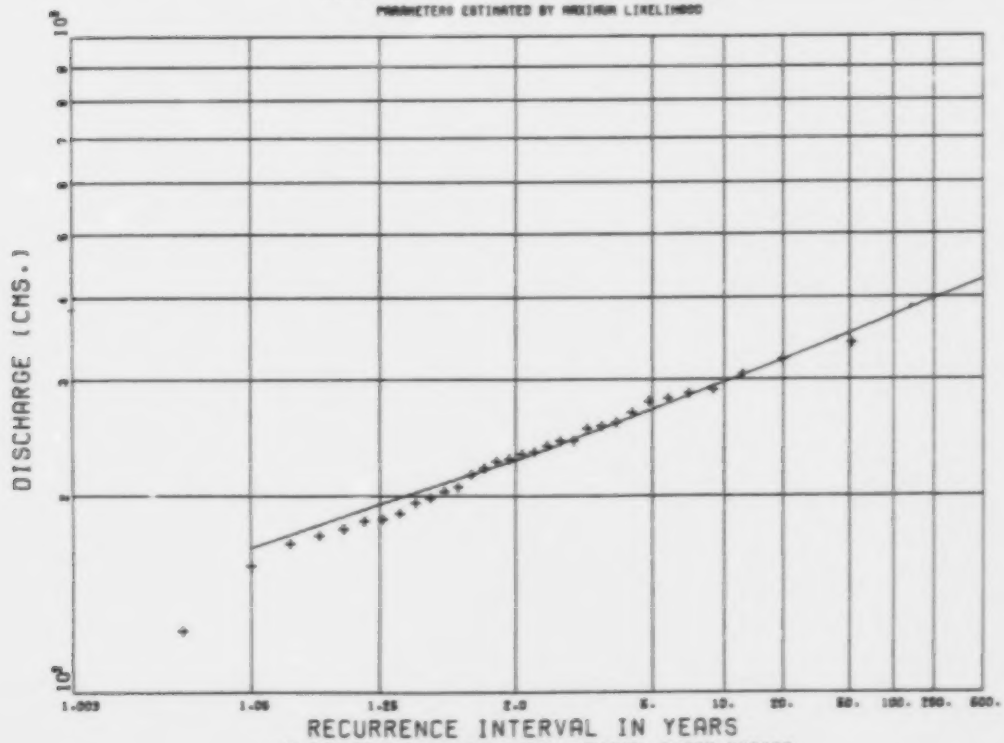
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 55.7464 M = 5.1474 S = .2666

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	166.
1.250	.800	194.
2.000	.500	225.
2.330	.429	234.
5.000	.200	270.
10.000	.100	297.
20.000	.050	321.
50.000	.020	353.
100.000	.010	375.
200.000	.005	397.
500.000	.002	425.

KABINAKAGAMI RIVER AT HIGHWAY NO. 11 04JA002
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 2147.0
1-156

KAMINISTIQUIA RIVER AT KAKABEKA FALLS POWERHOUSE 02AB010

DRAINAGE AREA : 6710.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1924 - 1982

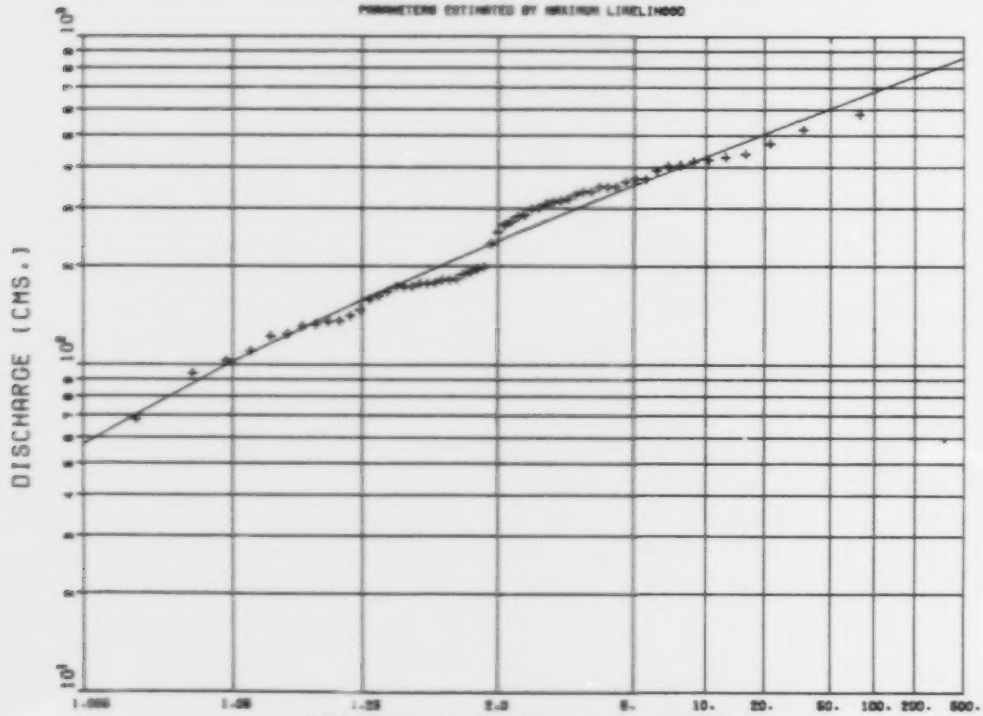
SAMPLE STATISTICS
MEAN = 261. S.D. = 119.2 C.S. = .5069 C.K. = 2.6522
SAMPLE STATISTICS (LOGS)
MEAN = 5.4541 S.D. = .4863 C.S. = -.2678 C.K. = 2.4423
SAMPLE MIN = 68. SAMPLE MAX = 580. N = 59

PARAMETERS FOR GUMBEL I A = .010402 U = 235.
PARAMETERS FOR LOGNORMAL M = 5.4541 S = .4863
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -40. M = 5.6268 S = .4082
STATISTICS OF LOG(X-A)
MEAN = 5.6268 S.D. = .4082 C.S. = -.1286 C.K. = 2.2531
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0651 B = .5578E+02 LOG(M) = 9.0861
ME= .8832E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1715 B = .8306E+01
LOG(M)F= 6.8786 M = .9713E+03
DISTRIBUTION STATISTICS MEAN = 5.4541 S.D. = .4943 C.S. = -.6939

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	45.		67.		57.		47.		59.	
1.050	98.		105.		102.		95.		101.	
1.250	159.		155.		157.		158.		156.	
2.000	245.		234.		238.		247.		239.	
2.330	260.	6.10	255.	6.38	251.	6.52	269.	6.44	260.	6.80
5.000	349.	6.46	352.	7.37	352.	6.89	357.	6.02	354.	6.87
10.000	421.	6.87	436.	8.55	429.	8.06	420.	6.08	429.	7.68
20.000	490.	7.22	521.	9.71	504.	9.60	473.	6.57	500.	9.20
50.000	580.	7.59	635.	11.20	603.	11.00	534.	7.76	591.	12.00
100.000	647.	7.82	724.	12.20	678.	13.50	574.	8.93	658.	14.40
200.000	714.	8.01	818.	13.20	755.	15.20	610.	10.30	724.	16.90
500.000	802.	8.22	948.	14.40	860.	17.50	653.	12.10	811.	20.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KAMINISTIQUIA RIVER AT KAKABEKA FALLS POWERHOUSE 02AB010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II40.0

KAMINISTIKWIA RIVER AT KAMINISTIKWIA 02AB006

DRAINAGE AREA : 6480.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1926 - 1982

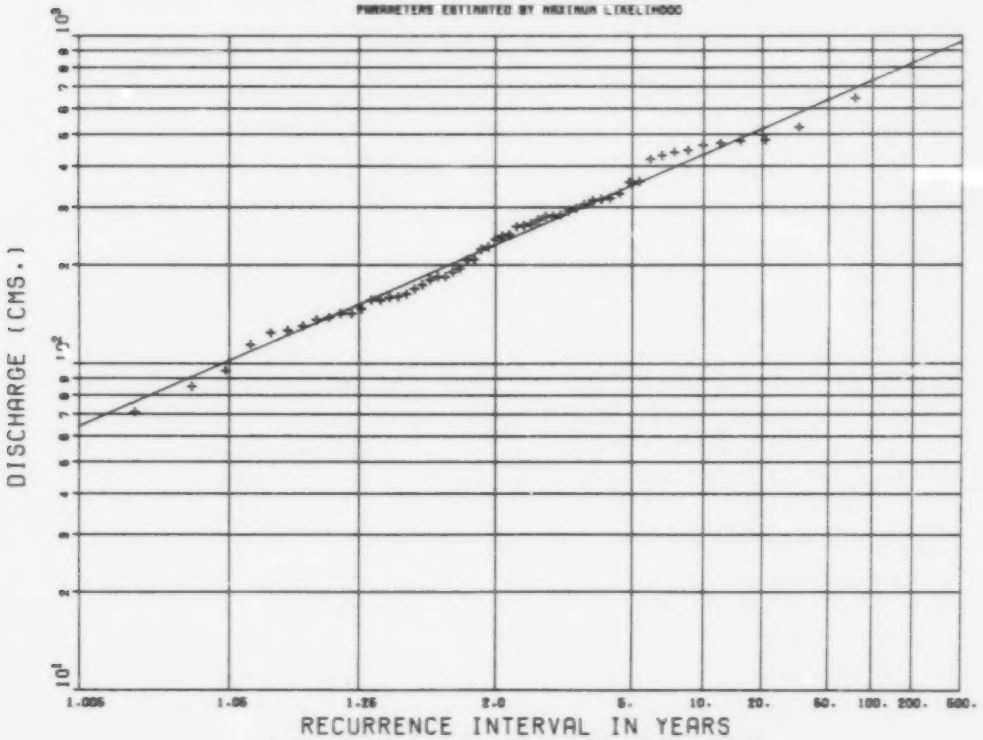
SAMPLE STATISTICS
MEAN = 258. S.D. = 127.8 C.S. = .8939 C.K. = 3.5034
SAMPLE STATISTICS (LOGS)
MEAN = 5.4367 S.D. = .4951 C.S. = -.0881 C.K. = 2.6524
SAMPLE MIN = 71. SAMPLE MAX = 644. N = 57

PARAMETERS FOR GUMBEL I A = .810501 U = 201.
PARAMETERS FOR LOGNORMAL P = 5.4367 S = .4951
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 5.4336 S = .4966
STATISTICS OF LOG(X-A)
MEAN = 5.4336 S.D. = .4966 C.S. = -.0916 C.K. = 2.6560
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0218 B = .9156E+03 LOG(M) =16.6792
ME= .1753E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0390 B = .1507E+03
LOG(M)F=11.6255 M = .1119E+06
DISTRIBUTION STATISTICS MEAN = 5.4367 S.D. = .4912 C.S. = -.1507

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	42.		64.		64.		60.		62.	
1.050	95.		102.		102.		100.		100.	
1.250	156.		151.		151.		153.		152.	
2.000	236.		230.		230.		233.		231.	
2.330	256.	6.25	251.	6.61	251.	6.94	254.	6.98	253.	7.08
5.000	344.	6.61	340.	7.63	342.	7.64	340.	7.26	343.	7.49
10.000	415.	7.02	433.	8.85	433.	9.12	427.	8.30	431.	8.66
20.000	484.	7.37	519.	10.10	519.	10.90	504.	9.90	512.	10.50
50.000	573.	7.75	635.	11.60	636.	13.60	604.	12.90	626.	13.70
100.000	639.	7.98	727.	12.60	728.	15.50	680.	15.40	704.	16.40
200.000	705.	8.17	822.	13.60	824.	17.40	757.	18.00	789.	19.20
500.000	793.	8.39	956.	14.90	958.	19.90	860.	21.70	907.	23.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KAMINISTIKWIA RIVER AT KAMINISTIKWIA 02AB006
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I149.0

KAMINISTIQUIA RIVER AT OUTLET OF DOG LAKE 02AB004

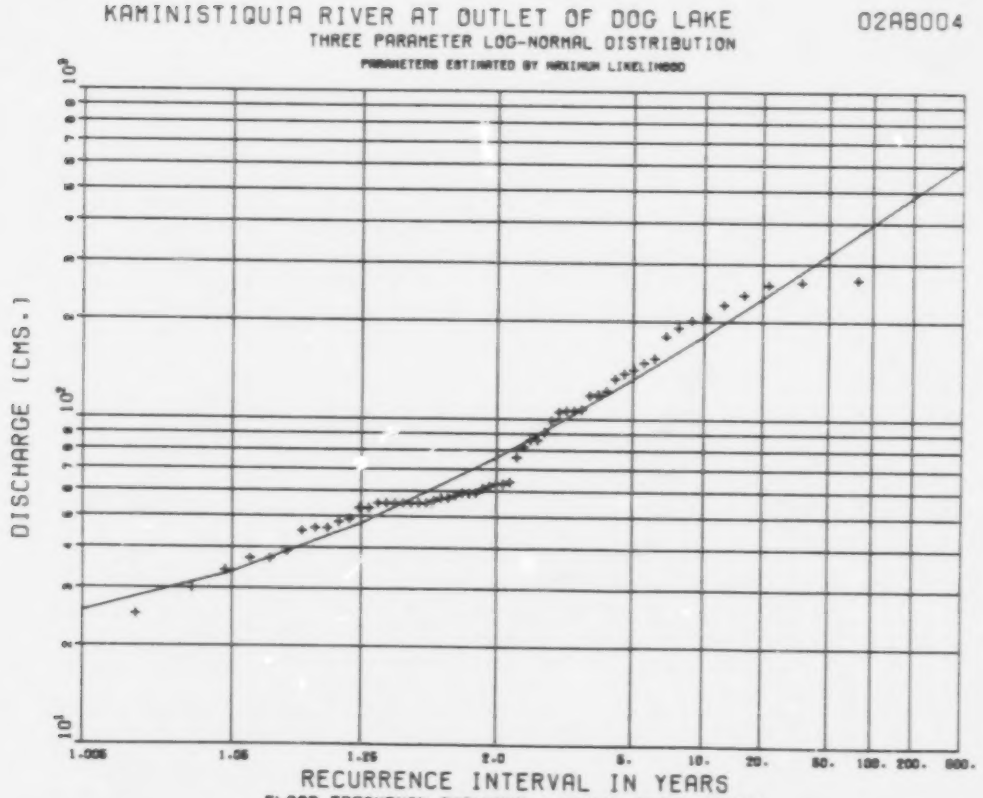
DRAINAGE AREA = 3760.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1924 - 1982

SAMPLE STATISTICS
MEAN = 97. S.D. = 64.7 C.S. = 1.3344 C.K. = 4.0043
SAMPLE STATISTICS (LOGS)
MEAN = 4.3833 S.D. = .5997 C.S. = .4598 C.K. = 2.4989
SAMPLE MIN = 25. SAMPLE MAX = 269. N = 59

PARAMETERS FOR GUMBEL I A = .024583 U = 69.
PARAMETERS FOR LOGNORMAL P = 4.3833 S = .5997
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 19. M = 4.0439 S = .8121
STATISTICS OF LOG(X-A)
MEAN = 4.0439 S.D. = .8121 C.S. = -.0176 C.K. = 2.9262
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1379 B = .1892E+02 LOG(P) = 1.7750
ME= .5900E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .2146 B = .7038E+01
LOG(M)F= 2.7011 M = .1490E+02
DISTRIBUTION STATISTICS MEAN = 4.3833 S.D. = .6889 C.S. = .7144

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		17.		26.		25.		22.	
1.050	24.		38.		54.		54.		51.	
1.250	58.		68.		87.		88.		88.	
2.000	84.		88.		76.		75.		77.	
2.330	93.	7.24	89.	7.87	84.	8.57	83.	8.36	85.	8.74
5.000	131.	7.33	133.	9.89	132.	10.60	129.	10.70	131.	10.20
10.000	161.	7.62	173.	10.50	180.	13.10	178.	14.06	177.	13.00
20.000	191.	7.88	215.	12.00	235.	15.80	239.	18.00	231.	16.80
50.000	229.	8.17	275.	13.80	321.	19.60	342.	23.90	317.	23.10
100.000	257.	8.35	323.	15.00	396.	22.10	441.	28.70	395.	28.30
200.000	286.	8.50	375.	16.20	481.	24.70	563.	33.80	487.	33.60
500.000	323.	8.67	451.	17.70	610.	27.80	771.	40.80	634.	41.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I150.0

KAMINISTIQUIA RIVER NEAR DONA 02AB001

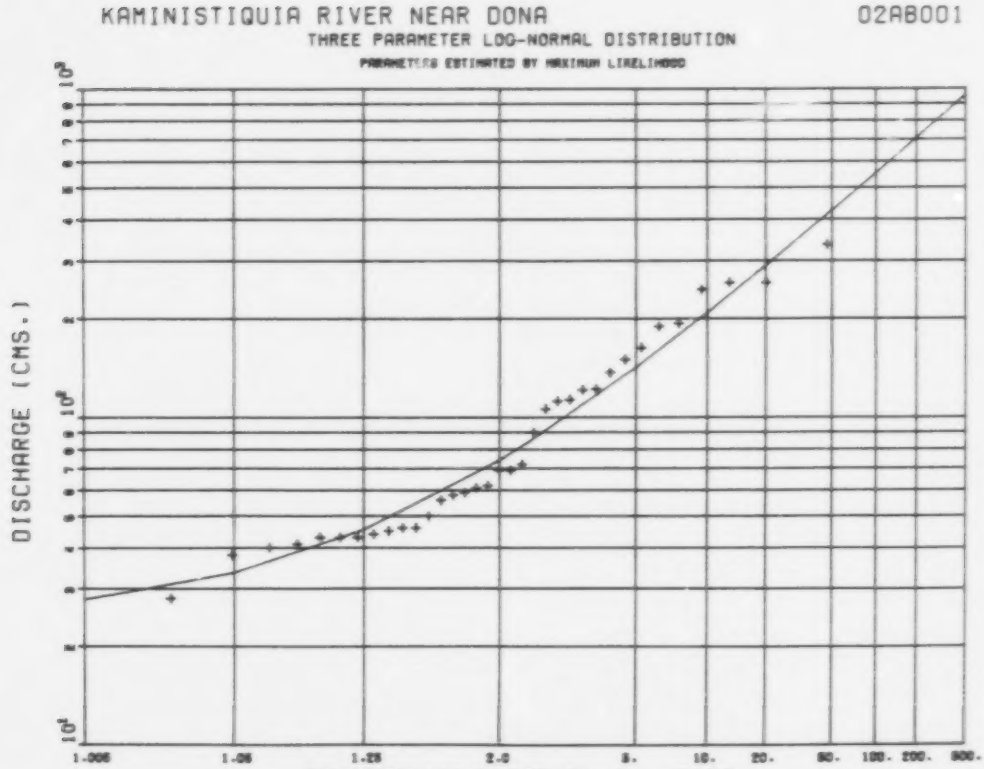
DRAINAGE AREA = 3670.0 SQ. KM.
REGULATED FLOW = 0 CLASS 3
PERIOD OF RECORD = 1922 - 1956

SAMPLE STATISTICS
MEAN = 101. S.D. = 77.2 C.S. = 1.4356 C.K. = 4.7131
SAMPLE STATISTICS (LOGS)
MEAN = 4.4032 S.D. = .6880 C.S. = .5199 C.K. = 2.4112
SAMPLE MIN = 29. SAMPLE MAX = 335. N = 35

PARAMETERS FOR GUMBEL I A = .020979 U = 71.
PARAMETERS FOR LOGNORMAL M = 4.4032 S = .6880
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 24. M = 3.9828 S = 1.0172
STATISTICS OF LOG(Y-A)
MEAN = 3.9025 S.D. = 1.0172 C.S. = -.8815 C.K. = 2.8767
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1736 B = .1480E+02 LOG(P) = 1.8335
MS= .6256E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1759 B = .3268E+01
LOG(P)F= 3.1602 M = .2354E+02
DISTRIBUTION STATISTICS MEAN = 4.4032 S.D. = .6844 C.S. = 1.1012

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-0.		15.		28.		27.		29.	
1.050	18.		27.		33.		34.		35.	
1.250	48.		47.		45.		46.		46.	
2.	88.		82.		74.		72.		77.	
2.330	95.	10.40	92.	11.40	81.	12.60	81.	11.90	87.	12.70
5.	142.	13.20	143.	13.10	141.	16.60	136.	16.90	140.	15.00
10.	178.	10.60	192.	15.20	207.	21.00	204.	22.90	198.	19.20
20.	213.	10.70	245.	17.30	294.	25.30	298.	29.60	284.	23.10
50.	257.	11.00	322.	19.90	426.	30.60	480.	36.30	385.	34.60
100.	290.	11.20	386.	21.70	552.	34.70	680.	47.00	497.	42.60
200.	323.	11.40	457.	23.50	706.	38.40	958.	55.00	633.	51.10
500.	367.	11.60	559.	25.60	951.	43.00	1530.	66.10	861.	63.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1151.0

KAPUSKASING RIVER AT KAPUSKASING 04LF001

DRAINAGE AREA : 6760.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1919 - 1982

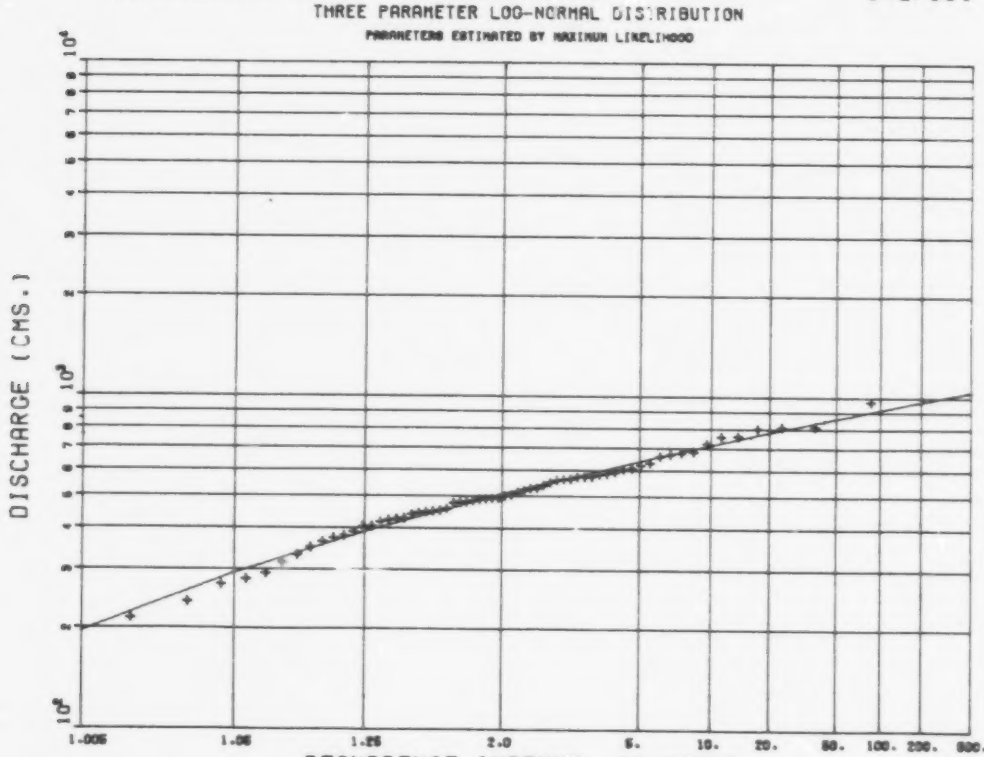
SAMPLE STATISTICS
MEAN = 516. S.D. = 149.2 C.S. = .5074 C.K. = 3.7120
SAMPLE STATISTICS (LOGS)
MEAN = 6.2035 S.D. = .3007 C.S. = -.4543 C.K. = 3.6437
SAMPLE MIN = 214. SAMPLE MAX = 969. N = 64

PARAMETERS FOR GUMBEL I A = .007562 U = 445.
PARAMETERS FOR LOGNORMAL M = 6.2035 S = .3007
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -424. M = 6.8337 S = .1577
STATISTICS OF LOG(X-A)
MEAN = 6.8337 S.D. = .1577 C.S. = .0035 C.K. = 3.3290
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0683 B = .1938E+02 LOG(M) = 7.5275
ME= .1858E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0577 B = .2663E+02
LOG(M)F= 7.7403 M = .2299E+04
DISTRIBUTION STATISTICS MEAN = 6.2035 S.D. = .2978 C.S. = -.3875

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	225.		228.		195.		206.		200.	
1.050	298.		302.		292.		294.		291.	
1.250	382.		384.		389.		398.		387.	
2.000	494.		494.		505.		504.		506.	
2.330	522.	4.02	522.	3.79	531.	3.82	531.	3.91	533.	4.04
5.000	643.	4.63	637.	4.37	656.	3.83	658.	3.89	664.	3.85
10.000	743.	5.14	727.	5.07	713.	4.34	714.	4.22	714.	4.16
20.000	838.	5.58	811.	5.77	780.	5.13	779.	4.88	778.	4.99
50.000	961.	6.05	917.	6.63	860.	6.36	856.	6.13	851.	6.60
100.000	1050.	6.34	995.	7.24	916.	7.35	908.	7.25	900.	8.13
200.000	1150.	6.59	1070.	7.81	970.	8.26	957.	8.46	945.	9.55
500.000	1270.	6.88	1180.	8.53	1040.	9.69	1020.	10.10	1000.	11.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

KAPUSKASING RIVER AT KAPUSKASING 04LF001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : T152.0

KASHABOWIE RIVER AT OUTLET OF KASHABOWIE LAKE 02AB013

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 526.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1952 - 1982

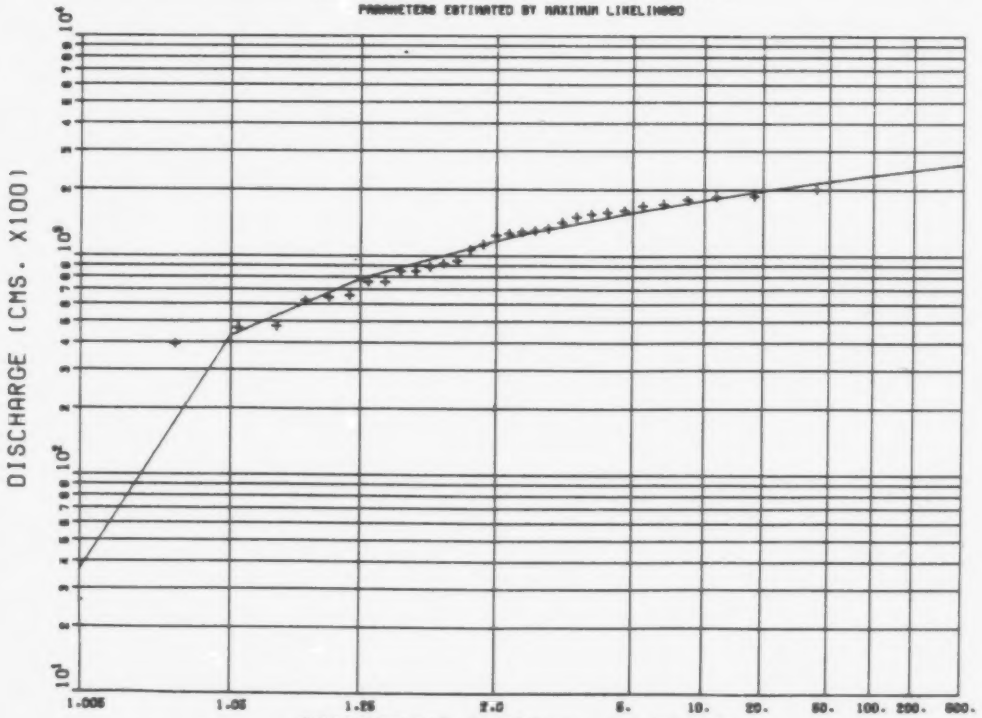
SAMPLE STATISTICS
MEAN = 1176. S.D. = 467.6 C.S. = .0460 C.K. = 2.1782
SAMPLE STATISTICS (LOGS)
MEAN = 6.9805 S.D. = .4505 C.S. = -.5868 C.K. = 2.7593
SAMPLE MIN = 394. SAMPLE MAX = 2010. N = 31

PARAMETERS FOR GUMBEL I A = .002420 U = 948.
PARAMETERS FOR LOGNORMAL M = 6.9805 S = .4505
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -8014. M = 9.1247 S = .0589
STATISTICS OF LOG(X-A)
MEAN = 9.1247 S.D. = .0509 C.S. = -.0203 C.K. = 2.1771
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1322 B = .1162E+02 LOG(M) = 8.5159
ME= .4993E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3831 B = .1708E+01
LOG(M)F= 7.6359 M = .2069E+04
DISTRIBUTION STATISTICS MEAN = 6.9805 S.D. = .5007 C.S. =-1.5302

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	259.		337.		36.		148.		263.	
1.050	488.		513.		427.		407.		480.	
1.250	751.		736.		774.		745.		750.	
2.000	1100.		1080.		1160.		1210.		1120.	
2.330	1190.	7.93	1170.	8.15	1250.	7.34	1310.	0.00	1210.	8.71
5.000	1570.	8.53	1570.	9.42	1570.	6.54	1620.	0.00	1580.	7.92
10.000	1800.	9.14	1820.	10.90	1780.	7.42	1.20.	0.00	1850.	8.40
20.000	2100.	9.65	2250.	12.40	1970.	7.82	1890.	0.00	2080.	10.20
50.000	2560.	10.20	2710.	14.30	2180.	9.37	1980.	0.00	2350.	13.90
100.000	2850.	10.50	3070.	15.60	2320.	10.60	2020.	0.00	2530.	17.10
200.000	3140.	10.80	3430.	16.80	2450.	11.90	2040.	0.00	2690.	20.40
500.000	3520.	11.10	3949.	18.60	2610.	13.60	2060.	0.00	2890.	25.00

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

KASHABOWIE RIVER AT OUTLET OF KASHABOWIE LAKE 02AB013
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 3153.0

KAWINOGANS RIVER NEAR PICKLE CROW 04FA002

DRAINAGE AREA : 1541.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1968 - 1992

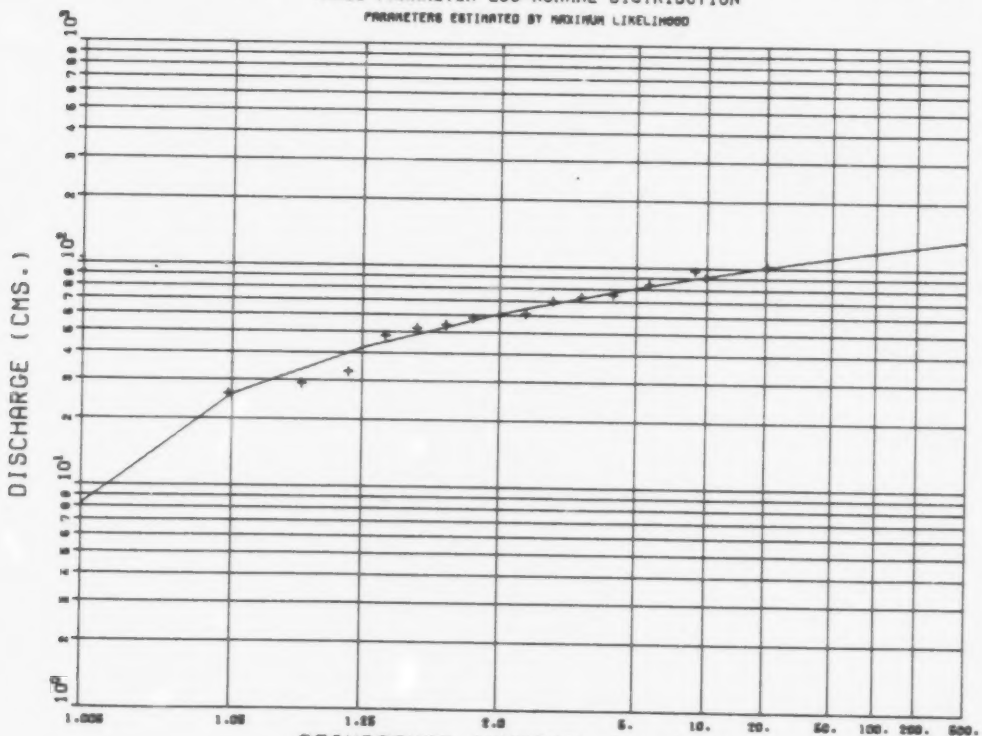
SAMPLE STATISTICS
MEAN = 61. S.D. = 22.8 C.S. = .1525 C.K. = 3.2648
SAMPLE STATISTICS (LOGS)
MEAN = 4.0457 S.D. = .4115 C.S. = -.6270 C.K. = 3.4978
SAMPLE MIN = 24. SAMPLE MAX = 102. N = 15

PARAMETERS FOR GUMBEL I A = .050148 U = 51.
PARAMETERS FOR LOGNORMAL M = 4.3457 S = .4115
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -198. M = 5.5547 S = .0879
STATISTICS OF LOG(X-A)
MEAN = 5.5547 S.D. = .0879 C.S. = -.0242 C.K. = 3.2134
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1290 a = .1017E+02 LOG(m) = 5.3582
m= .2123E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2539 B = .2808E+01
LOG(m)F= 4.7584 M = .1165E+03
DISTRIBUTION STATISTICS MEAN = 4.0457 S.D. = .4252 C.S. =-1.1934

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	17.		23.		3.		12.		16.	
1.050	25.		29.		26.		25.		27.	
1.250	41.		40.		42.		42.		41.	
2.000	58.		57.		61.		62.		60.	
2.330	62.	10.50	62.	10.70	65.	9.96	66.	9.69	64.	11.50
5.000	81.	11.50	81.	12.40	91.	9.17	82.	8.10	81.	10.20
10.000	96.	12.50	97.	14.30	91.	9.61	91.	7.27	94.	10.80
20.000	110.	13.30	112.	16.30	101.	11.30	97.	6.68	104.	13.30
50.000	128.	14.10	133.	18.70	112.	13.70	103.	6.27	115.	18.20
100.000	142.	14.60	149.	20.40	119.	15.60	107.	6.27	123.	22.40
200.000	156.	15.10	165.	22.10	126.	17.60	109.	6.51	130.	26.90
500.000	175.	15.50	187.	24.10	135.	20.20	112.	7.08	138.	32.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KAWINOGANS RIVER NEAR PICKLE CROW 04FA002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : X154.0
I-163

KEMPTVILLE CREEK NEAR KEMPTVILLE 02LA006

DRAINAGE AREA : 409.8 SQ. KM.
REGULATED FLOW : CLASS :
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 60. S.D. = 11.6 C.S. = -.1239 C.K. = 2.4590
SAMPLE STATISTICS (LOGS)
MEAN = 4.1723 S.D. = .1819 C.S. = -.3082 C.K. = 2.6182
SAMPLE MIN = 48. SAMPLE MAX = 82. N = 13

PARAMETERS FOR GUMBEL I A = .097739 U = 60.
PARAMETERS FOR LOGNORMAL M = 4.1723 S = .1819

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0280 B = .4212E+02 LOG(M) = 5.3528
ME= .2112E+03

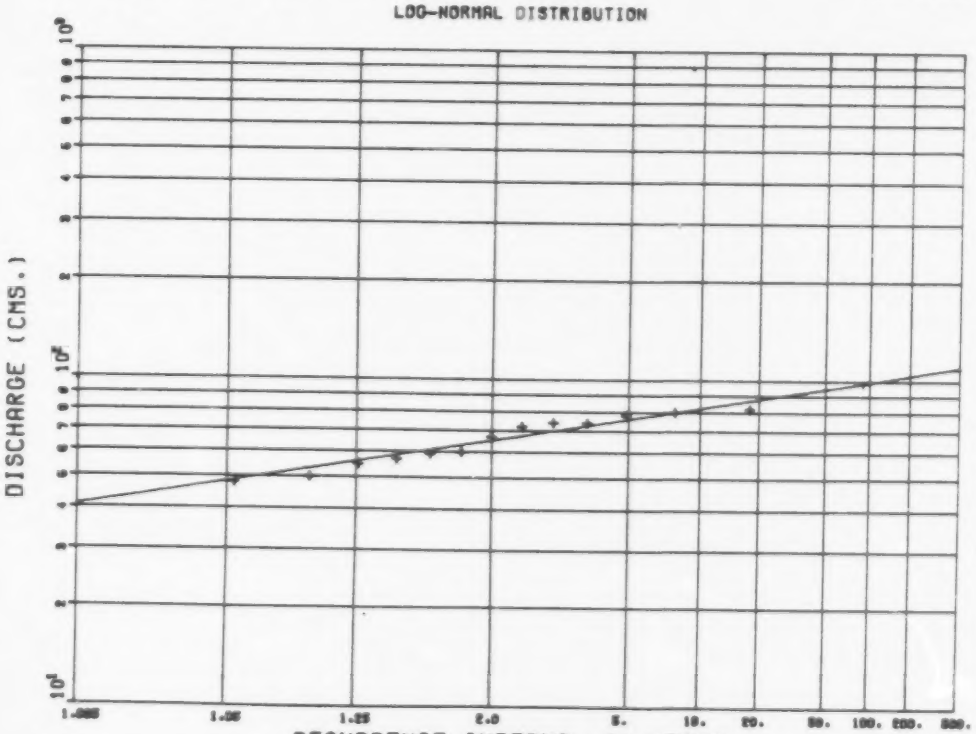
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	43.		41.		0.		0.		39.	
1.050	49.		48.		0.		0.		47.	
1.250	55.		56.		0.		0.		56.	
2.000	64.		65.		0.		0.		66.	
2.330	66.	5.44	67.	5.88	0.	0.00	0.	0.00	68.	5.42
5.000	76.	6.77	76.	5.87	0.	0.00	0.	0.00	76.	5.41
10.000	83.	7.68	82.	6.81	0.	0.00	0.	0.00	81.	6.00
20.000	91.	8.86	88.	7.74	0.	0.00	0.	0.00	86.	7.18
50.000	100.	9.97	94.	8.98	0.	0.00	0.	0.00	91.	9.35
100.000	107.	10.70	99.	9.71	0.	0.00	0.	0.00	95.	11.30
200.000	114.	11.20	104.	10.50	0.	0.00	0.	0.00	99.	13.10
500.000	124.	12.10	110.	11.40	0.	0.00	0.	0.00	122.	16.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KEMPTVILLE CREEK NEAR KEMPTVILLE 02LA006

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I155.0
I-164

KENNY CREEK NEAR BURFORD 02GB009

DRAINAGE AREA : 389.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1962 - 1982

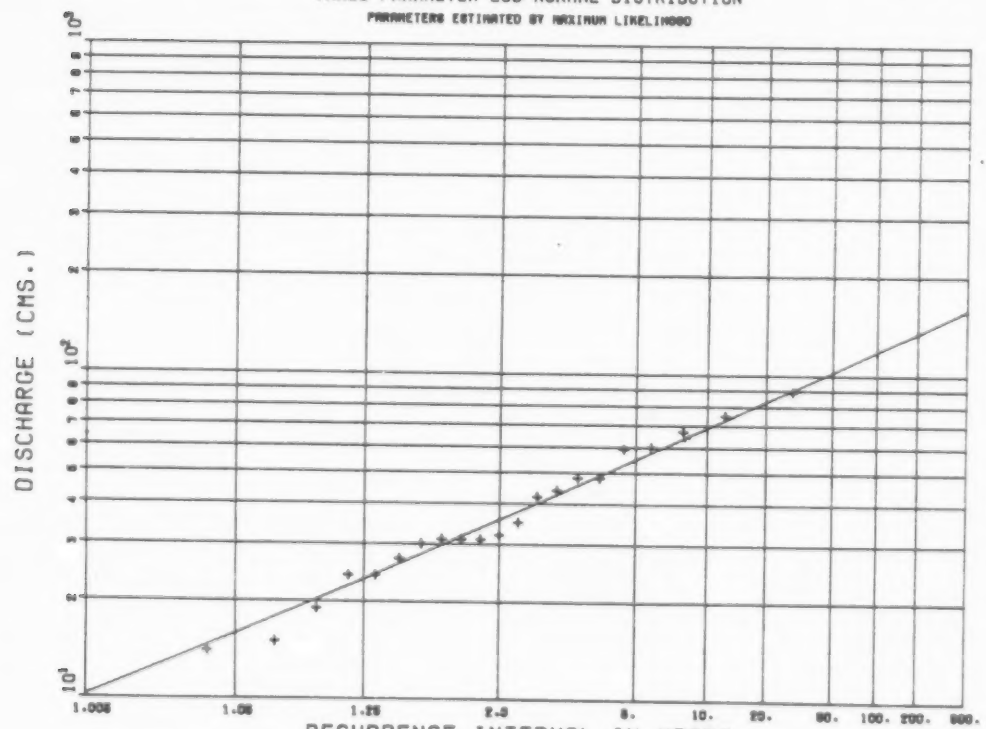
SAMPLE STATISTICS
MEAN = 40. S.D. = 20.1 C.S. = .9035 C.K. = 3.7726
SAMPLE STATISTICS (LOGS)
MEAN = 3.5769 S.D. = .5035 C.S. = -.0687 C.K. = 3.0070
SAMPLE MIN = 14. SAMPLE MAX = 89. N = 21

PARAMETERS FOR GUMBEL I A = .067331 U = 31.
PARAMETERS FOR LOGNORMAL M = 3.5769 S = .5035
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 3.5279 S = .5287
STATISTICS OF LOG(X-A)
MEAN = 3.5279 S.D. = .5287 C.S. = -.1217 C.K. = 3.0432
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0173 B = .8476E+03 LOG(M) =18.2367
ME= .8319E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0320 B = .2368E+03
LOG(M)F=11.1438 M = .6913E+05
DISTRIBUTION STATISTICS MEAN = 3.5769 S.D. = .4918 C.S. = -.1300

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	7.		10.		11.		9.		9.	
1.050	15.		16.		16.		16.		15.	
1.250	24.		27.		21.		24.		23.	
2.333	37.		39.		36.		36.		36.	
5.430	46.	10.30	50.	11.10	49.	11.70	49.	11.50	52.	11.90
10.000	54.	10.80	55.	12.80	55.	13.10	54.	12.10	55.	12.60
20.000	65.	11.60	63.	14.80	69.	15.70	67.	13.90	68.	14.50
50.000	75.	12.20	83.	16.90	83.	19.00	79.	16.40	81.	17.40
100.000	89.	12.80	101.	19.40	102.	21.90	95.	18.70	97.	19.20
200.000	100.	13.20	119.	21.20	119.	26.50	107.	20.90	112.	22.70
500.000	113.	13.50	131.	22.90	134.	29.90	120.	30.40	127.	33.60
1000.000	124.	13.80	152.	24.90	155.	34.20	136.	36.60	146.	39.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KENNY CREEK NEAR BURFORD 02GB009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I156.0

KENOGAMI RIVER AT KENOGAMI DAM (1939-64) 04JD002

DRAINAGE AREA : 4270.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1939 - 1964

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	199.	93.	.228	4.377
LN X SERIES	4.98	1.35	-4.128	23.555

X(MIN) = 3. CMS. TOTAL SAMPLE SIZE= 26
X(MAX) = 427. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	207.	86.	.566	4.304
LN X SERIES	5.23	.50	-1.252	6.297
LN (X-A) SERIES	6.36	.15	.020	4.428

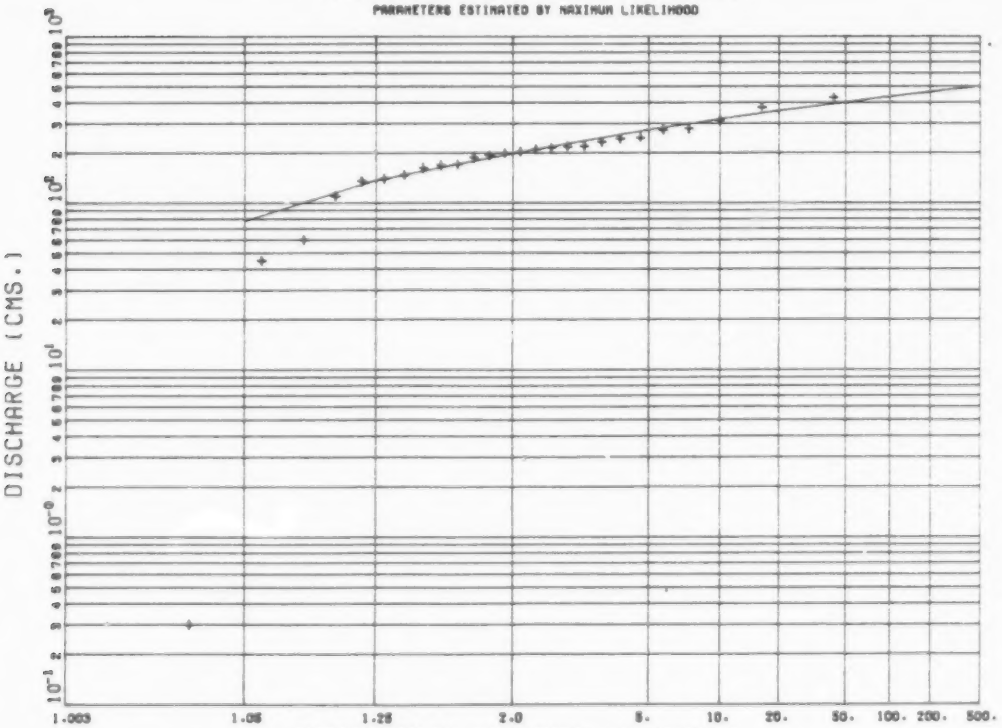
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -377.1179 M = 6.3595 S = .1455

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	78.
1.250	.800	136.
2.000	.500	197.
2.330	.429	212.
5.000	.200	273.
10.000	.100	317.
20.000	.050	355.
50.000	.020	400.
100.000	.010	432.
200.000	.005	462.
500.000	.002	500.

KENOGAMI RIVER AT KENOGAMI DAM (1939-64) 04JD002
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1157.0

KENOGAMI RIVER AT KENOGAMI DAM (1966-80) 04JD002

DRAINAGE AREA : 4270.0 SQ. KM.
REGULATED FLOW : GLASS 4
PERIOD OF RECORD : 1966 - 1980

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	156.	81.	-.122	3.195
LN X SERIES	4.71	1.14	-2.074	9.501

X(MIN)= 4. CMS. TOTAL SAMPLE SIZE= 15
X(MAX)= 303. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	167.	84.	-.087	3.404
LN X SERIES	4.95	.69	-1.330	6.191
LN (X-A) SERIES	7.17	.06	-.022	3.407

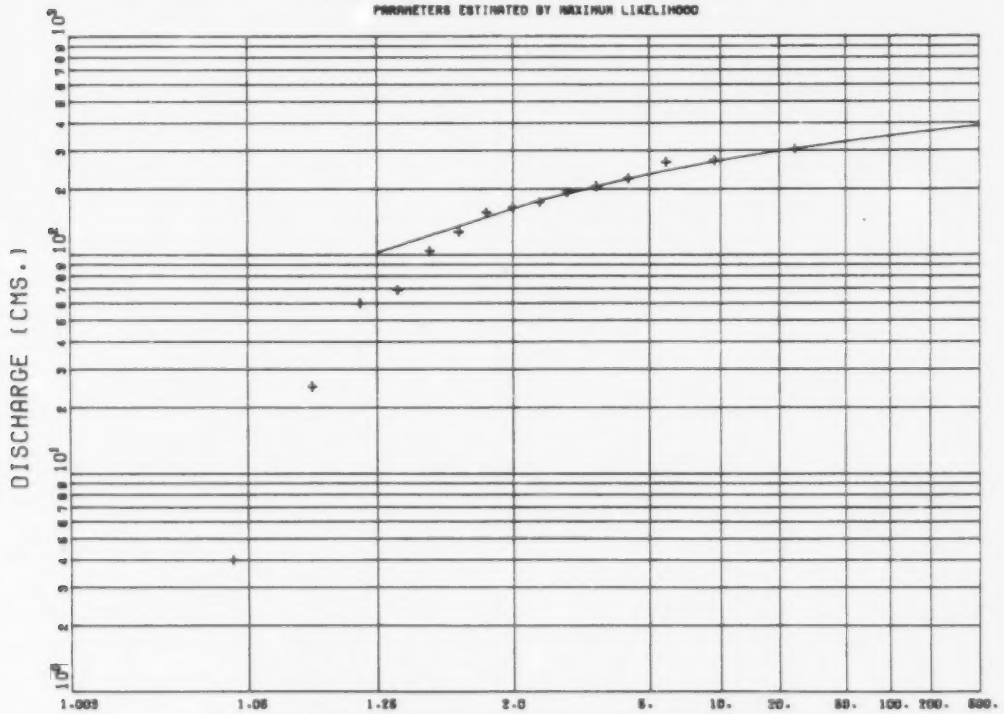
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1467.6784 M = 7.1687 S = .0643

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	102.
2.000	.500	152.
2.330	.429	173.
5.000	.200	234.
10.000	.100	269.
20.000	.050	297.
50.000	.020	328.
100.000	.010	348.
200.000	.005	366.
500.000	.002	388.

KENOGAMI RIVER AT KENOGAMI DAM (1966-80) 04JD002
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I157.1

KENOGAMI RIVER NEAR MAMMAMATTAWA 04JG001

DRAINAGE AREA : 26200.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1967 - 1982

SAMPLE STATISTICS
MEAN = 1974. S.D. = 448.5 C.S. = -.0174 C.K. = 2.8366
SAMPLE STATISTICS (LOGS)
MEAN = 7.5621 S.D. = .2384 C.S. = -.5040 C.K. = 3.7716
SAMPLE MIN = 1129. SAMPLE MAX = 2636. N = 16

PARAMETERS FOR GUMBEL I A = .002447 U = 1758.
PARAMETERS FOR LOGNORMAL M = 7.5621 S = .2384

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0681 B = .1575E+02 LOG(M) = 8.5079
ME= .4954E+04

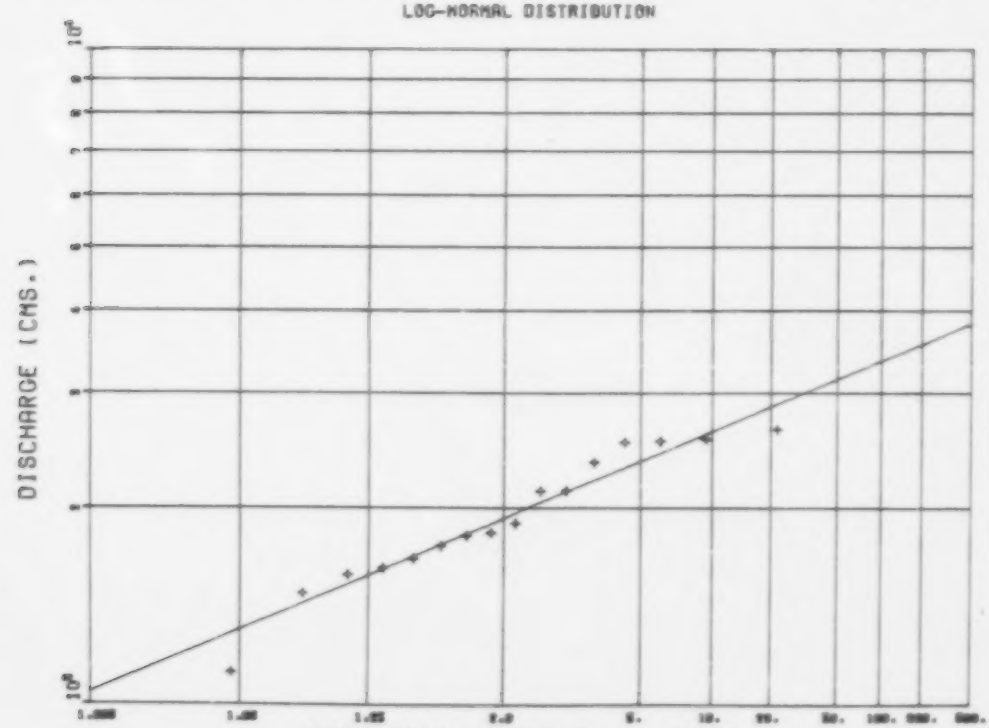
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1080.		1040.		0.		0.		930.	
1.050	1380.		1300.		0.		0.		1260.	
1.250	1560.		1570.		0.		0.		1590.	
2.000	1910.		1920.		0.		0.		1960.	
2.370	1990.	6.50	2010.	6.01	0.	0.00	0.	0.00	2040.	6.41
5.000	2370.	7.77	2350.	6.94	0.	0.00	0.	0.00	2360.	6.00
10.000	2680.	8.82	2610.	8.04	0.	0.00	0.	0.00	2570.	6.44
20.000	2970.	9.73	2850.	9.14	0.	0.00	0.	0.00	2740.	7.75
50.000	3350.	10.70	3140.	10.50	0.	0.00	0.	0.00	2940.	10.30
100.000	3640.	11.40	3350.	11.50	0.	0.00	0.	0.00	3070.	12.60
200.000	3920.	11.90	3550.	12.40	0.	0.00	0.	0.00	3180.	15.10
500.000	4300.	12.50	3820.	13.50	0.	0.00	0.	0.00	3320.	18.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KENOGAMI RIVER NEAR MAMMAMATTAWA 04JG001

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I158.0

KETTLE CREEK AT ST. THOMAS 02GC002

DRAINAGE AREA : 329.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

SAMPLE STATISTICS
MEAN = 146. S.D. = 50.4 C.S. = 1.0748 C.K. = 5.0869
SAMPLE STATISTICS (LOGS)
MEAN = 4.9333 S.D. = .3278 C.S. = .2959 C.K. = 3.4697
SAMPLE MIN = 79. SAMPLE MAX = 275. N = 16

PARAMETERS FOR GUMBEL I A = .027220 U = 124.
PARAMETERS FOR LOGNORMAL M = 4.9333 S = .3278
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 46. M = 4.4915 S = .5028
STATISTICS OF LOG(X-A)
MEAN = 4.4915 S.D. = .5028 C.S. = -.0969 C.K. = 3.4738
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0485 B = .4567E+02 LOG(M) = 2.7177
ME= .1515E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0772 B = .1721E+02
LOG(M)F= 3.6352 M = .3679E+02
DISTRIBUTION STATISTICS MEAN = 4.9333 S.D. = .3202 C.S. = .4822

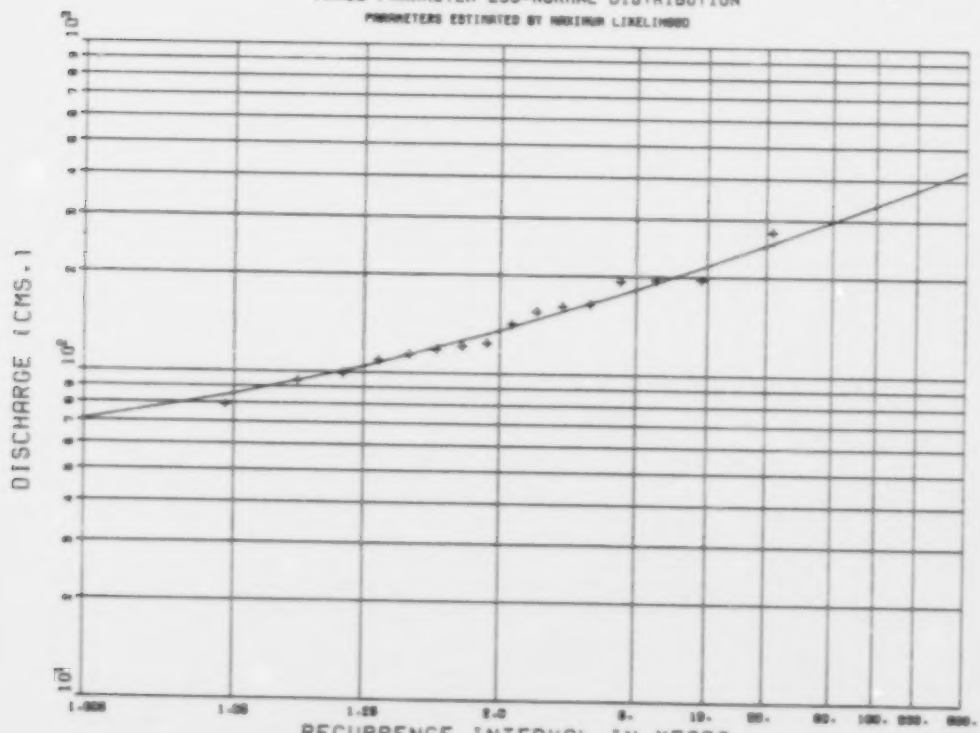
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	63.		60.		79.		70.		65.	
1.050	83.		81.		85.		86.		83.	
1.250	107.		105.		104.		106.		105.	
2.000	138.		139.		135.		135.		137.	
2.333	145.	8.01	147.	8.26	144.	9.03	143.	8.67	145.	9.04
5.000	179.	9.23	183.	9.54	182.	10.90	180.	10.50	182.	10.30
10.000	207.	10.30	211.	11.10	216.	13.70	212.	13.30	213.	12.80
20.000	233.	11.10	238.	12.60	250.	17.10	245.	16.90	244.	16.20
50.000	268.	12.10	272.	14.50	297.	21.80	290.	22.50	286.	21.80
100.000	293.	12.70	298.	15.80	333.	25.50	327.	27.00	319.	26.40
200.000	319.	13.20	323.	17.00	372.	29.10	366.	31.90	354.	31.40
500.000	352.	13.70	357.	18.60	426.	33.90	423.	38.50	402.	38.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

KETTLE CREEK AT ST. THOMAS 02GC002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I159.0

KWATABOAHEGAN RIVER NEAR THE MOUTH 04KA001

DRAINAGE AREA = 4290.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	446.	238.	.282	4.741
LN X SERIES	5.94	.65	-1.162	7.531

X(MIN)= 89. CMS. TOTAL SAMPLE SIZE= 10
X(MAX)= 821. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	485.	205.	.543	4.998
LN X SERIES	6.10	.43	-.059	4.389
LN (X-A) SERIES	5.64	.68	-.356	4.387

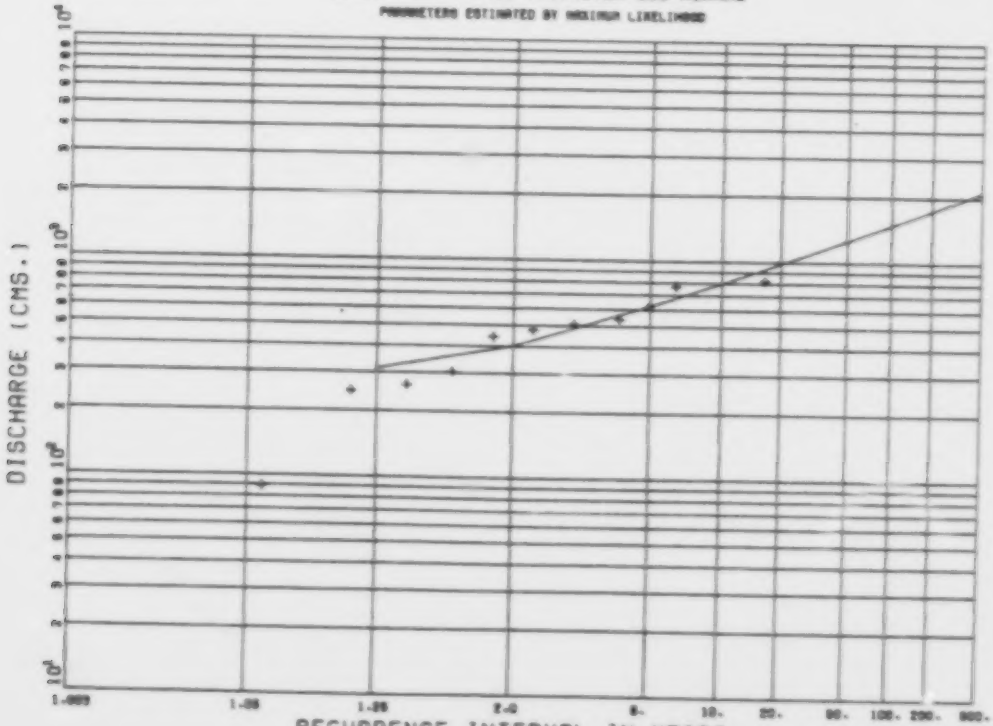
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 145.4799 Y = 5.6402 S = .6832

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.099	.997	-
1.050	.952	-
1.250	.800	312.
2.000	.500	441.
2.330	.429	458.
5.000	.200	620.
10.000	.100	794.
20.000	.050	982.
50.000	.020	1260.
100.000	.010	1490.
200.000	.005	1740.
500.000	.002	2110.

KWATABOAHEGAN RIVER NEAR THE MOUTH 04KA001
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I160.0

LA VALLEE RIVER NEAR DEVLIN 05PC016

DRAINAGE AREA : 243.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1960 - 1982

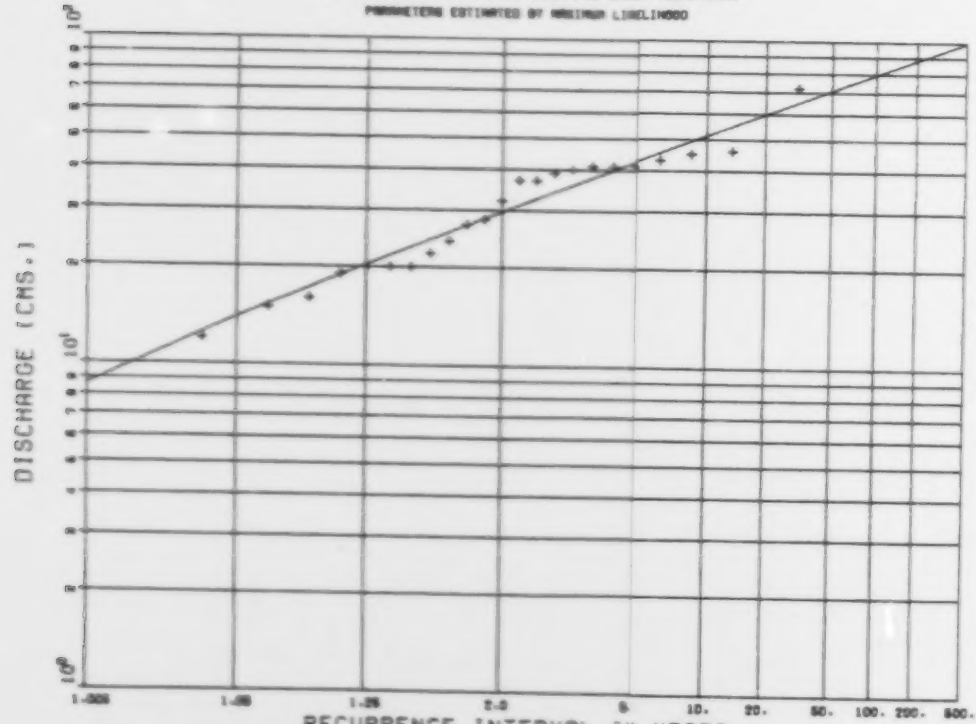
SAMPLE STATISTICS
MEAN = 32. S.D. = 13.9 . C.S. = .8721 C.K. = 4.9398
SAMPLE STATISTICS (LOGS)
MEAN = 3.3760 S.D. = .4444 C.S. = -.1960 C.K. = 2.8895
SAMPLE MIN = 12. SAMPLE MAX = 72. N = 23

PARAMETERS FOR GUMBEL I A = .091726 U = 26.
PARAMETERS FOR LOGNORMAL M = 3.3760 S = .4444
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -3. M = 3.4853 S = .3981
STATISTICS OF LOG(X-A)
MEAN = 3.4853 S.D. = .3981 C.S. = -.1092 C.K. = 2.8862
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0435 B = .1041E+03 LOG(M) = 7.9107
ME= .2726E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0698 B = .3903E+02
LOG(M)F= 6.1000 M = .4459E+03
DISTRIBUTION STATISTICS MEAN = 3.3760 S.D. = .4360 C.S. = -.3201

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	8.		9.		9.		8.		9.	
1.050	14.		14.		14.		14.		14.	
1.250	21.		20.		20.		20.		20.	
2.000	30.		29.		30.		30.		30.	
2.330	32.	9.00	32.	9.34	32.	9.69	32.	9.61	32.	9.97
5.000	42.	9.73	43.	10.80	43.	10.40	42.	9.70	43.	10.30
10.000	50.	10.50	52.	12.50	51.	12.20	50.	10.70	51.	11.60
20.000	58.	11.10	61.	14.20	60.	14.00	58.	12.50	59.	14.00
50.000	68.	11.70	73.	16.30	71.	18.10	66.	15.90	70.	18.20
100.000	76.	12.10	82.	17.80	79.	20.80	73.	18.80	77.	21.80
200.000	83.	12.40	92.	19.30	88.	23.50	79.	22.00	85.	25.60
500.000	94.	12.80	105.	21.00	100.	27.00	87.	26.40	95.	31.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

LA VALLEE RIVER NEAR DEVLIN 05PC016
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I161.0

LADY EVELYN RIVER AT LADY EVELYN LAKE 02JD011

DRAINAGE AREA = 1270.8 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1947 - 1982

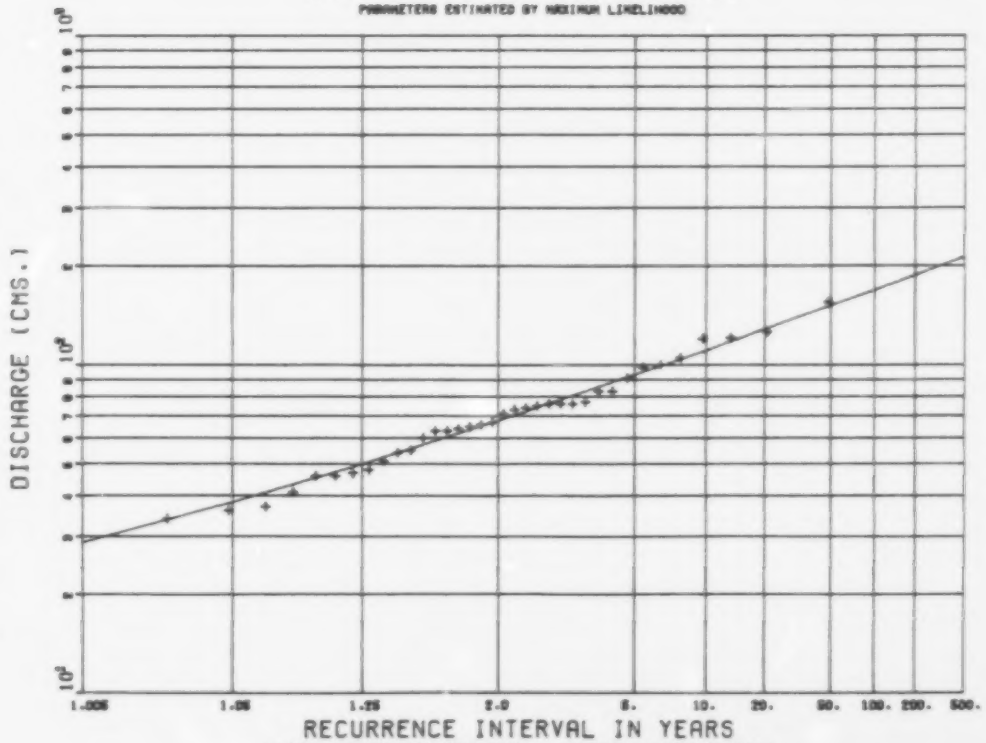
SAMPLE STATISTICS
MEAN = 73. S.D. = 27.6 C.S. = 1.0181 C.K. = 4.3675
SAMPLE STATISTICS (LOGS)
MEAN = 4.2227 S.D. = .3670 C.S. = .0947 C.K. = 2.9788
SAMPLE MIN = 34. SAMPLE MAX = 155. N = 36

PARAMETERS FOR GUMBEL I A = .047894 U = 61.
PARAMETERS FOR LOGNORMAL M = 4.2227 S = .3670
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 10. M = 4.0419 S = .4386
STATISTICS OF LOG(X-A)
MEAN = 4.0419 S.D. = .4386 C.S. = -.0722 C.K. = 2.9712
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0174 B = .4465E+03 LOG(M) =-3.5325
ME= .2923E-01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0247 B = .2146E+03
LOG(M)F=-1.9813 M = .3392E+00
DISTRIBUTION STATISTICS MEAN = 4.2227 S.D. = .3621 C.S. = .1365

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	26.		27.		29.		28.		27.	
1.050	37.		37.		38.		38.		38.	
1.250	51.		50.		50.		50.		50.	
2.000	68.		68.		67.		68.		68.	
2.330	73.	6.08	73.	6.17	72.	6.63	72.	6.56	72.	6.65
5.000	92.	6.83	93.	7.12	93.	7.55	92.	7.31	93.	7.33
10.000	108.	7.48	109.	8.26	110.	9.19	109.	8.80	110.	8.77
20.000	123.	8.03	125.	9.38	128.	11.20	125.	10.90	126.	10.90
50.000	142.	8.62	145.	10.80	151.	14.10	147.	14.40	148.	14.30
100.000	157.	8.98	160.	11.80	169.	16.40	164.	17.30	164.	17.20
200.000	171.	9.29	176.	12.70	187.	18.60	182.	20.30	181.	20.20
500.000	190.	9.64	196.	13.90	212.	21.50	206.	24.60	205.	24.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

LADY EVELYN RIVER AT LADY EVELYN LAKE 02JD011
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I162.0
I-172

LAUREL CREEK AT WATERLOO 02GA024

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

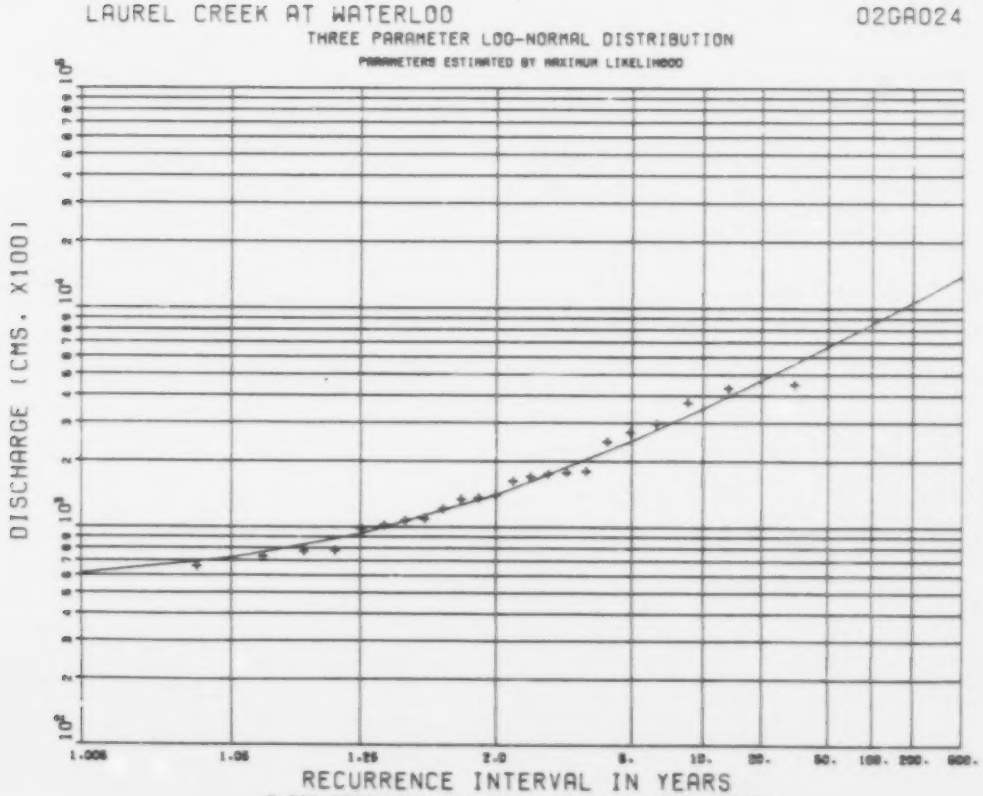
DRAINAGE AREA : 59.6 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1960 - 1982

SAMPLE STATISTICS
MEAN = 1015. S.D. = 1124.7 C.S. = 1.3004 C.K. = 4.2871
SAMPLE STATISTICS (LOGS)
MEAN = 7.3441 S.D. = .5642 C.S. = .4270 C.K. = 2.8120
SAMPLE MIN = 657. SAMPLE MAX = 4500. N = 23

PARAMETERS FOR GUMBEL I A = .001384 U = 1343.
PARAMETERS FOR LOGNORMAL M = 7.3441 S = .5642
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 533. M = 6.7706 S = .9494
STATISTICS OF LOG(X-A)
MEAN = 6.7706 S.D. = .9494 C.S. = -.2553 C.K. = 2.9720
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1205 B = .2194E+02 LOG(M) = 4.7013
ME= .1101E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .3146 B = .3490E+01
LOG(M)F= 6.2460 M = .5160E+03
DISTRIBUTION STATISTICS MEAN = 7.3441 S.D. = .5877 C.S. = 1.0705

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	138.		362.		689.		536.		452.	
1.050	539.		612.		716.		723.		658.	
1.250	996.		963.		955.		941.		955.	
2.000	1610.		1550.		1400.		1400.		1490.	
2.330	1760.	10.90	1710.	11.90	1570.	13.50	1550.	12.60	1640.	13.10
5.000	2430.	11.20	2490.	13.70	2470.	18.10	2400.	17.30	2450.	19.30
10.000	2970.	11.70	3190.	15.90	3480.	23.20	3390.	24.10	3250.	19.30
20.000	3490.	12.20	3910.	18.00	4690.	28.30	4660.	31.10	4170.	24.90
50.000	4160.	12.70	4930.	20.70	6660.	35.00	7020.	41.30	5590.	34.00
100.000	4670.	13.00	5750.	22.60	8470.	39.70	9430.	49.50	6850.	41.60
200.000	5170.	13.30	6620.	24.40	10600.	44.20	12600.	57.90	8300.	49.70
500.000	5830.	13.60	7860.	26.70	14000.	49.70	18400.	69.60	10600.	60.90

F.E.= FLOOD ESTIPATE (CMS x100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I163.0

LITTLE CURRENT RIVER AT PERCY LAKE 04JF001

DRAINAGE AREA : 5360.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1969 - 1983

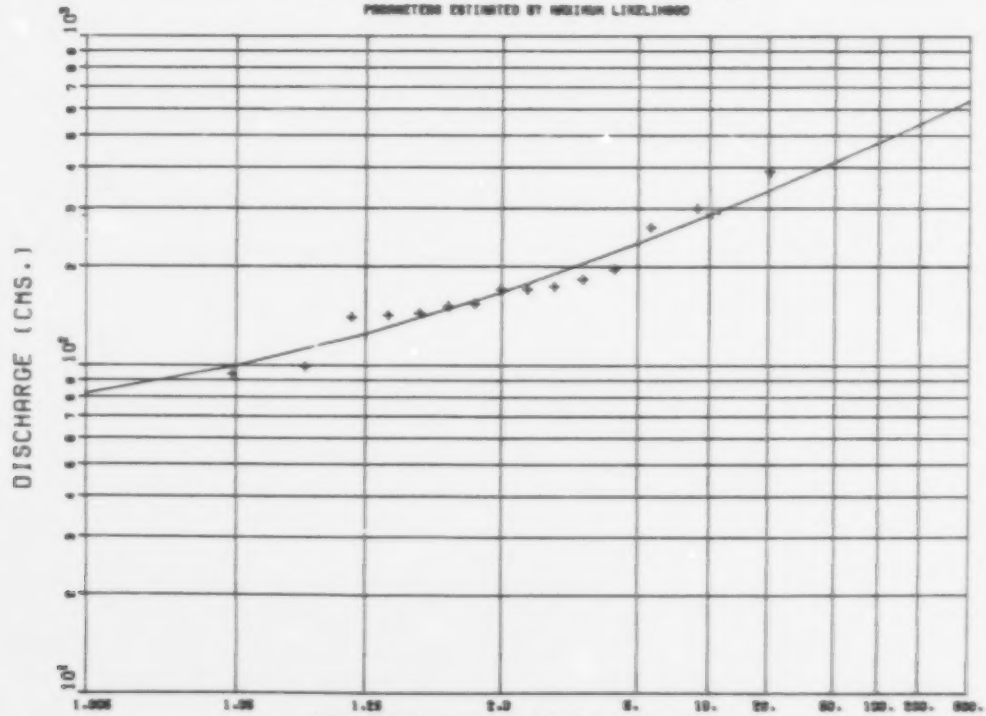
SAMPLE STATISTICS
MEAN = 185. S.D. = 77.7 C.S. = 1.9485 C.K. = 6.2123
SAMPLE STATISTICS (LOGS)
MEAN = 5.1477 S.D. = .3763 C.S. = .5798 C.K. = 4.3670
SAMPLE MIN = 94. SAMPLE MAX = 388. N = 15

PARAMETERS FOR GUMBEL I A = .019686 U = 153.
PARAMETERS FOR LOGNORMAL M = 5.1477 S = .3763
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 57. M = 4.8949 S = .5767
STATISTICS OF LOG(X-A)
MEAN = 4.6949 S.D. = .5767 C.S. = -.8197 C.K. = 4.2546
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1889 B = .1193E+02 LOG(M) = 3.8476
ME= .4648E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1977 B = .1234E+02
LOG(M)F= 3.8679 M = .4784E+02
DISTRIBUTION STATISTICS MEAN = 5.1477 S.D. = .3644 C.S. = .5694

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	58.		65.		82.		81.		80.	
1.050	94.		93.		99.		101.		99.	
1.250	129.		125.		124.		126.		125.	
2.000	171.		172.		166.		168.		166.	
5.000	182.	9.14	184.	9.79	178.	10.78	177.	10.10	177.	11.00
5.000	224.	10.30	236.	11.30	235.	13.10	230.	12.60	233.	13.10
10.000	267.	11.40	279.	13.10	286.	16.60	279.	16.10	283.	16.80
20.000	304.	12.20	320.	14.90	338.	20.60	330.	20.60	336.	22.20
50.000	351.	13.10	373.	17.10	410.	26.10	404.	29.30	417.	30.60
100.000	386.	13.70	413.	18.70	475.	30.30	466.	32.90	483.	38.20
200.000	422.	14.20	454.	20.20	540.	34.50	534.	38.70	557.	46.00
500.000	468.	14.80	509.	22.00	633.	39.80	635.	46.80	666.	56.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

LITTLE CURRENT RIVER AT PERCY LAKE 04JF001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1164.0

LITTLE DON RIVER AT DON MILLS/LANSING (COMBINED) 02HC029

DRAINAGE AREA = 130.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1955 - 1982

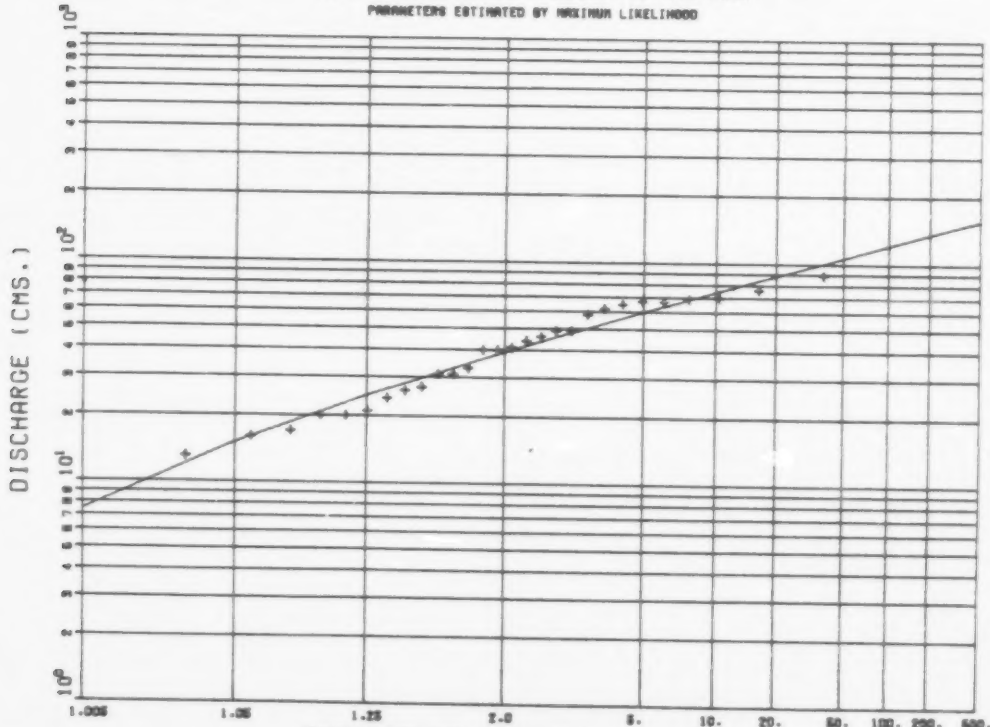
SAMPLE STATISTICS
MEAN = 43. S.D. = 21.1 C.S. = .3831 C.K. = 2.4430
SAMPLE STATISTICS (LOGS)
MEAN = 3.6380 S.D. = .5367 C.S. = -.3133 C.K. = 2.3756
SAMPLE MIN = 13. SAMPLE MAX = 89. N = 28

PARAMETERS FOR GUMBEL I A = .058271 U = 33.
PARAMETERS FOR LOGNORMAL M = 3.6380 S = .5367
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -8. M = 3.8476 S = .4343
STATISTICS OF LOG(X-A)
MEAN = 3.8476 S.D. = .4343 C.S. = -.1762 C.K. = 2.2497
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0841 B = .4074E+02 LOG(M) = 7.0639
ME= .1169E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3092 B = .3348E+01
LOG(M)= 4.6731 M = .1070E+03
DISTRIBUTION STATISTICS MEAN = 3.6380 S.D. = .5657 C.S. =-1.8930

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	5.		10.		7.		5.		8.	
1.050	14.		16.		15.		13.		15.	
1.250	25.		24.		25.		25.		24.	
2.000	40.		38.		39.		42.		39.	
5.000	57.	9.52	42.	10.20	43.	10.30	46.	9.73	43.	10.90
10.000	72.	9.90	60.	11.80	60.	13.00	61.	8.34	60.	12.90
20.000	84.	10.40	76.	13.70	74.	12.60	71.	7.66	74.	12.00
50.000	100.	10.90	92.	15.60	88.	14.90	79.	7.29	87.	14.40
100.000	112.	11.40	114.	17.90	106.	18.10	86.	7.30	104.	18.80
200.000	124.	11.70	132.	19.50	121.	20.90	91.	7.67	117.	22.60
500.000	140.	11.90	152.	21.10	136.	23.50	94.	8.28	130.	26.70
	140.	12.20	178.	23.00	156.	26.80	98.	9.32	146.	32.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

LITTLE DON RIVER AT DON MILLS/LANSING (COMBINED) 02HC029
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I165.0

LITTLE DON RIVER AT DON MILLS (1971 - 82) 02HC029

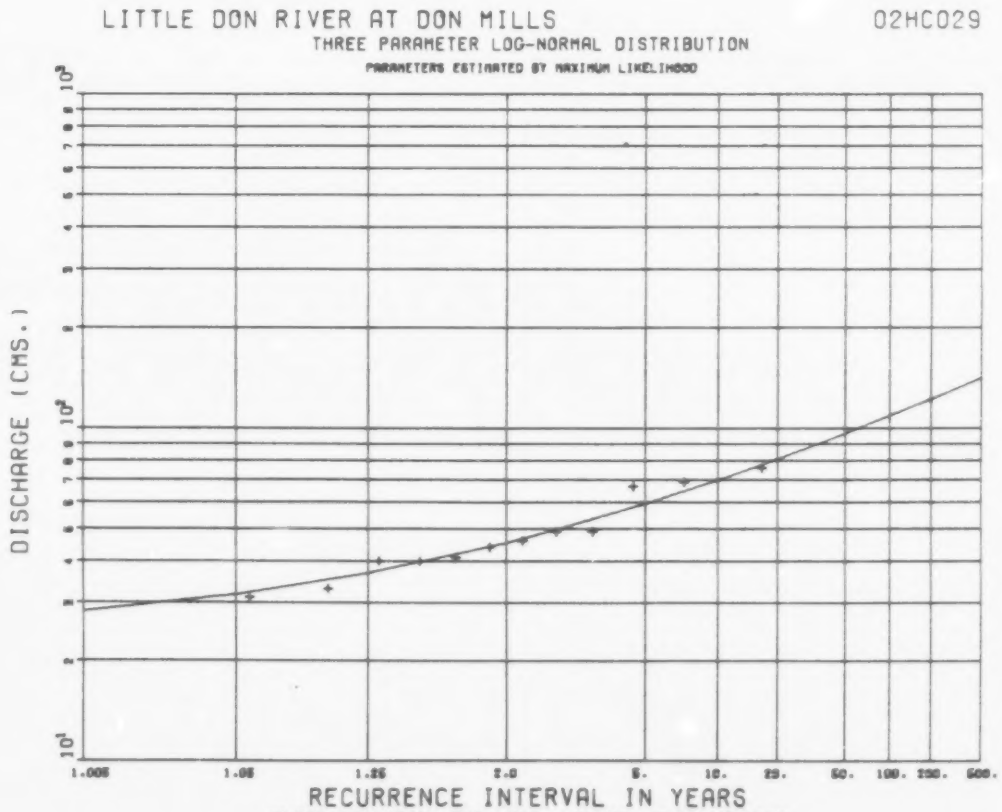
DRAINAGE AREA = 130.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1971 - 1982

SAMPLE STATISTICS
MEAN = 49. S.D. = 14.4 C.S. = .8408 C.K. = 3.6547
SAMPLE STATISTICS (LOGS)
MEAN = 3.8490 S.D. = .2830 C.S. = .4226 C.K. = 3.4036
SAMPLE MIN = 31. SAMPLE MAX = 76. N = 12

PARAMETERS FOR GUMBEL I A = .096198 U = 42.
PARAMETERS FOR LOGNORMAL M = 3.8490 S = .2830
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 23. M = 3.0943 S = .5822
STATISTICS OF LOG(X-A)
MEAN = 3.8943 S.D. = .5822 C.S. = -.1556 C.K. = 3.6497
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0598 B = .2239E+02 LOG(M) = 2.5095
ME= .1230E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .125E B = .5028E+01
LOG(M)= 3.2174 M = .2496E+02
DISTRIBUTION STATISTICS MEAN = 3.8490 S.D. = .2817 C.S. = .8920

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	25.		23.		28.		29.		25.	
1.050	31.		30.		32.		32.		31.	
1.250	38.		37.		37.		37.		37.	
2.000	46.		47.		45.		45.		46.	
2.330	48.	7.86	49.	8.24	48.	9.69	47.	8.55	48.	9.11
5.000	58.	9.32	60.	9.51	59.	11.90	58.	11.50	59.	10.60
10.000	66.	10.50	68.	11.00	70.	15.60	68.	15.30	68.	13.40
20.000	73.	11.60	75.	12.50	81.	19.50	79.	19.70	77.	17.30
50.000	83.	12.70	84.	14.40	96.	25.90	95.	26.20	89.	23.60
100.000	90.	13.40	91.	15.70	109.	30.60	108.	31.50	99.	28.80
200.000	98.	14.10	97.	17.00	122.	35.20	123.	36.90	109.	34.40
500.000	107.	14.80	106.	18.50	141.	41.20	144.	44.50	123.	42.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I165.1

- 02HC004

LITTLE DON RIVER NEAR LANSING

DRAINAGE AREA : 113.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1955 - 1964

SAMPLE STATISTICS
MEAN = 44. S.D. = 27.3 C.S. = .2507 C.K. = 2.7587
SAMPLE STATISTICS (LOGS) S.D. = .7104 C.S. = -.2035 C.K. = 2.4691
MEAN = 3.5862 SAMPLE MAX = 89. N = 10
SAMPLE MIN = 13.

PARAMETERS FOR GUMBEL I A = .046775 U = 32. S = 1.2329
PARAMETERS FOR LOGNORMAL M = 3.5862 S = .7104 M = 3.0053 C.K. = 3.4333
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. C.S. = -.6441 LOG(M) =10.5690
STATISTICS OF LOG(X-A) S.D. = 1.2329 B = .9562E+02
MEAN = 3.0053 A = -.0723 ME= .3891E+05
PARAMETERS FOR LOG PEARSON III BY MOMENTS

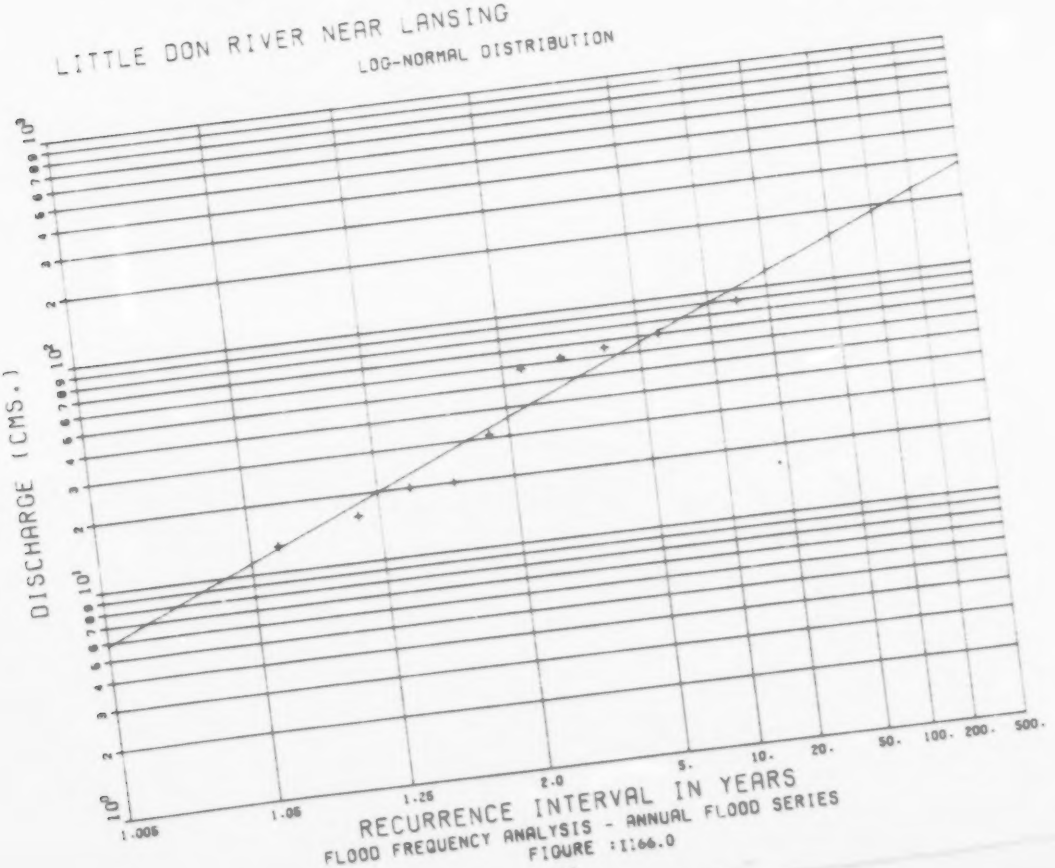
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-4.		6.		12.		0.		5.	
1.050	8.		11.		14.		0.		11.	
1.250	22.		20.		18.		0.		20.	
2.000	40.		36.		31.		0.		37.	
2.330	44.	19.40	41.	22.60	36.	27.70	0.	0.00	42.	24.20
5.000	64.	19.10	66.	26.10	68.	38.20	0.	0.00	66.	24.80
10.000	80.	19.60	90.	30.30	109.	48.20	0.	0.00	89.	28.10
20.000	95.	20.10	116.	34.50	164.	57.70	0.	0.00	111.	33.80
50.000	115.	20.60	155.	39.60	265.	69.30	0.	0.00	144.	43.90
100.000	130.	21.00	188.	43.20	366.	77.40	0.	0.00	169.	52.60
200.000	145.	21.30	225.	46.70	494.	84.90	0.	0.00	197.	61.90
500.000	165.	21.60	279.	51.00	714.	94.30	0.	0.00	235.	74.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

DATA FAILED NONPARAMETRIC TESTS

- 02HC004



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I166.0

LITTLE MAITLAND RIVER AT BLUEVALE 02FE007

DRAINAGE AREA : 326.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1968 - 1982

SAMPLE STATISTICS
MEAN = 113. S.D. = 51.8 C.S. = .5991 C.K. = 2.9692
SAMPLE STATISTICS (LOGS)
MEAN = 4.6285 S.D. = .4662 C.S. = .0047 C.K. = 2.5902
SAMPLE MIN = 50. SAMPLE MAX = 201. N = 15

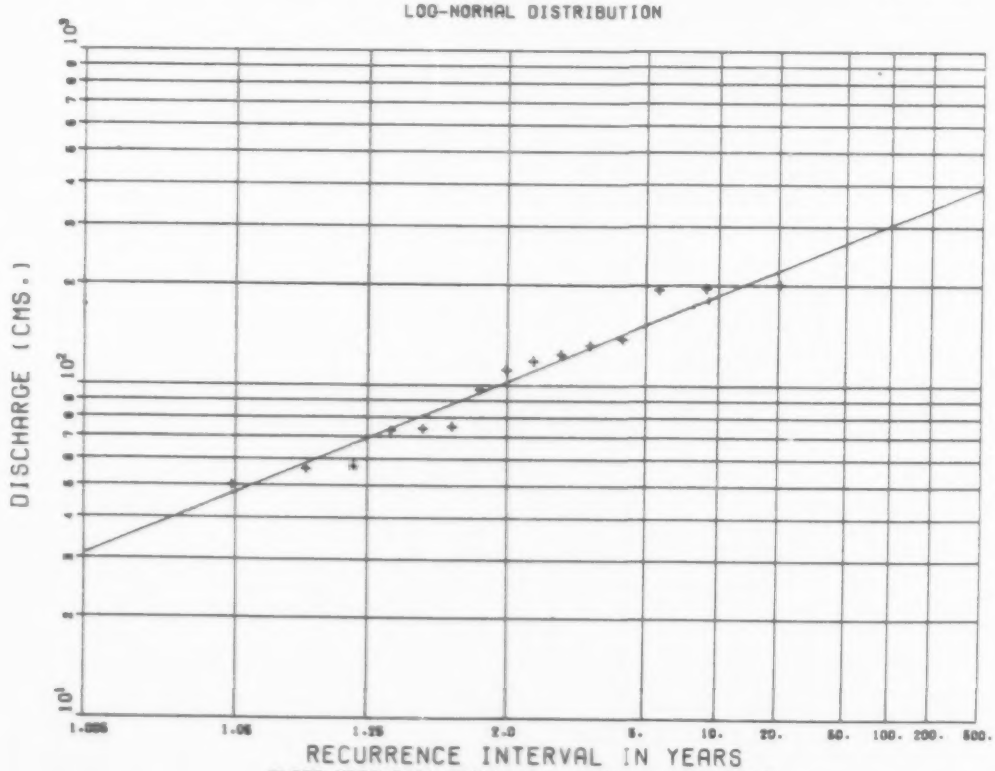
PARAMETERS FOR GUMBEL I A = .025489 U = 90.
PARAMETERS FOR LOGNORMAL M = 4.6285 S = .4662
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 31. M = 4.1903 S = .7147
STATISTICS OF LOG(X-A)
MEAN = 4.1903 S.D. = .7147 C.S. = -.3111 C.K. = 2.7502
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8011 B = .1817E+06 LOG(M) = *******
ME= .4985E-04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1009 B = .2350E+04
LOG(M)F= ******* M = .3368E-07
DISTRIBUTION STATISTICS MEAN = 4.6285 S.D. = .4504 C.S. = .0413

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	24.		31.		42.		33.		31.	
1.050	46.		48.		52.		49.		48.	
1.250	71.		69.		67.		70.		69.	
2.000	104.		102.		97.		102.		102.	
2.330	112.	11.40	111.	12.10	106.	13.60	111.	12.60	111.	13.00
5.000	148.	12.30	152.	14.00	152.	17.10	149.	13.80	152.	14.10
10.000	178.	13.20	186.	16.20	196.	21.90	183.	16.30	186.	16.60
20.000	206.	13.90	220.	18.50	245.	26.50	216.	20.00	221.	20.30
50.000	243.	14.70	267.	21.20	318.	33.10	261.	26.20	267.	26.50
100.000	270.	15.20	303.	23.20	379.	38.00	296.	31.50	303.	31.80
200.000	297.	15.60	340.	25.00	447.	42.70	332.	37.00	341.	37.40
500.000	333.	16.00	392.	27.30	549.	48.80	383.	44.70	393.	45.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

LITTLE MAITLAND RIVER AT BLUEVALE 02FE007

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I167.0

LITTLE OTTER CREEK NEAR STRAFFORDVILLE 02GC015

DRAINAGE AREA : 104.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1964 - 1992

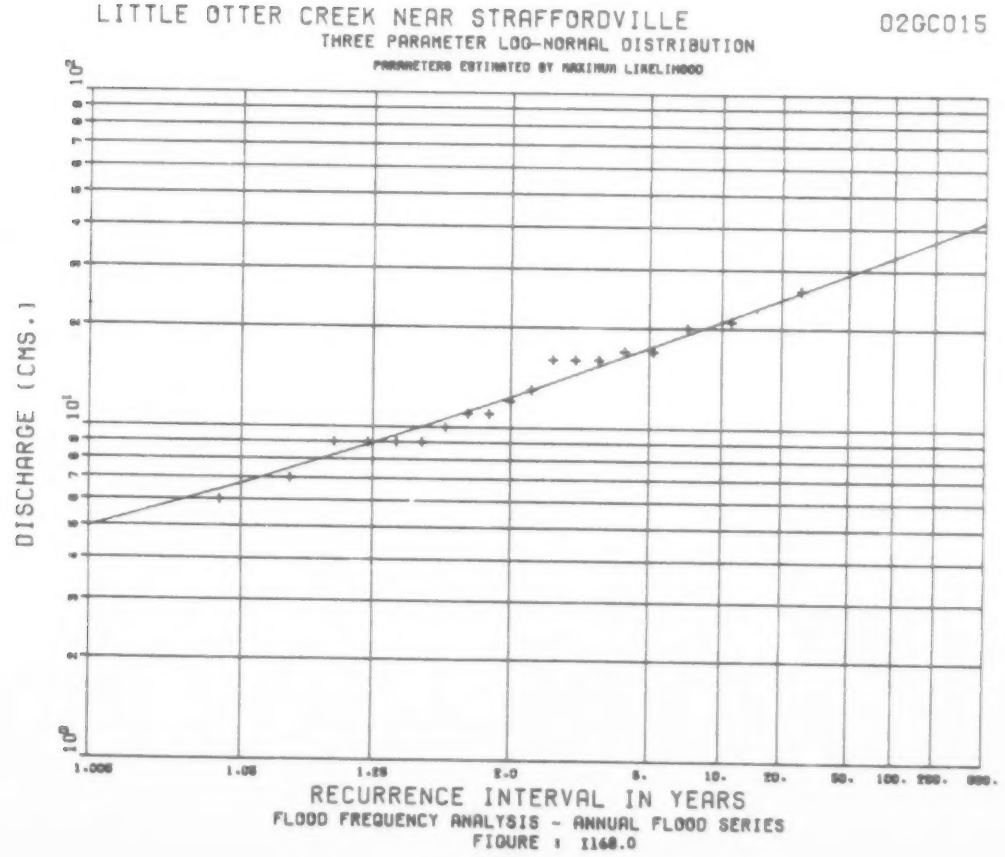
SAMPLE STATISTICS
MEAN = 13. S.D. = 5.3 C.S. = .7375 C.K. = 3.6677
SAMPLE STATISTICS (LOGS)
MEAN = 2.5241 S.D. = .3937 C.S. = .0861 C.K. = 2.8766
SAMPLE MIN = 6. SAMPLE MAX = 26. N = 19

PARAMETERS FOR GUMBEL I A = .246388 U = 11.
PARAMETERS FOR LOGNORMAL M = 2.5241 S = .3937
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 2.3603 S = .4629
STATISTICS OF LOG(X-A)
MEAN = 2.3603 S.D. = .4629 C.S. = -.1260 C.K. = 2.9607
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0012 B = .1073E+06 LOG(M) = ******
ME= .1184E-54

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	4.		5.		5.		0.		5.	
1.050	7.		7.		7.		0.		7.	
1.250	9.		9.		9.		0.		9.	
2.000	12.		13.		12.		0.		13.	
2.330	13.	8.83	13.	9.10	13.	9.78	0.	0.00	13.	9.78
5.000	17.	9.80	17.	10.50	17.	11.10	0.	0.00	17.	10.60
10.000	20.	10.70	21.	12.20	21.	13.50	0.	0.00	21.	12.50
20.000	23.	11.40	24.	13.90	24.	16.50	0.	0.00	24.	15.30
50.000	27.	12.20	28.	15.90	29.	20.70	0.	0.00	28.	19.90
100.000	30.	12.70	31.	17.40	33.	23.90	0.	0.00	31.	23.90
200.000	33.	13.10	34.	18.80	37.	27.10	0.	0.00	35.	28.10
500.000	36.	13.50	39.	20.50	42.	31.30	0.	0.00	39.	34.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I168.0

LITTLE PIC RIVER NEAR COLDWELL 02BA003

DRAINAGE AREA = 1320.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

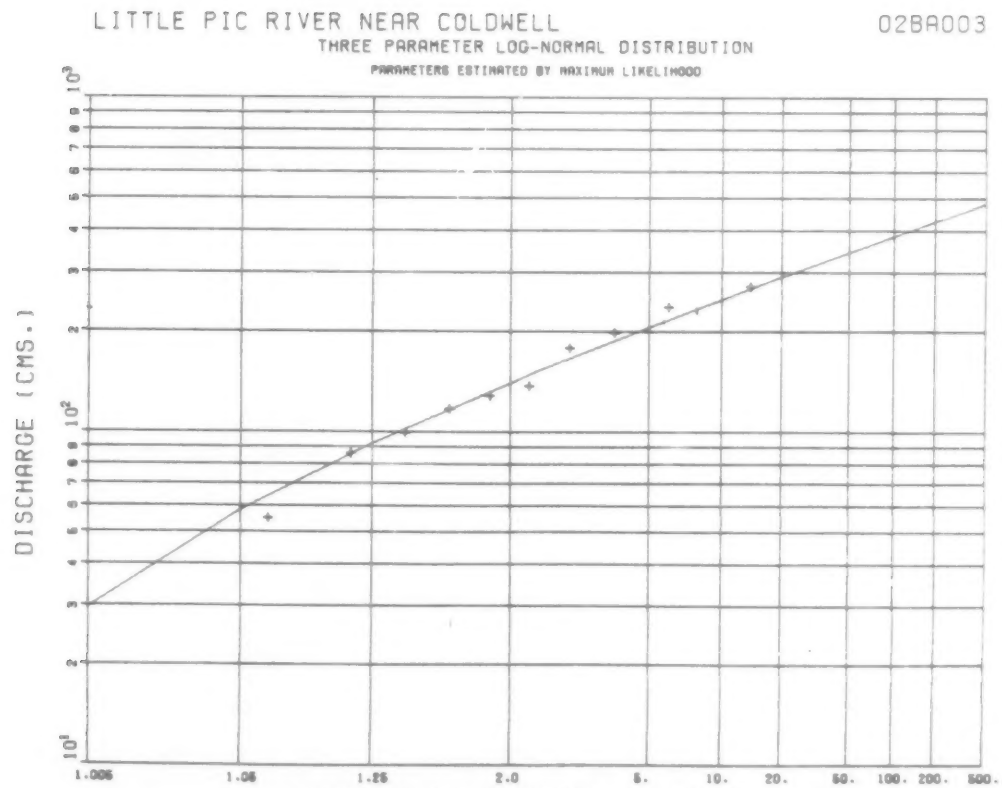
SAMPLE STATISTICS
MEAN = 151. S.D. = 69.0 C.S. = .5104 C.K. = 3.7165
SAMPLE STATISTICS (LOGS)
MEAN = 4.9131 S.D. = .4893 C.S. = -.3600 C.K. = 4.0950
SAMPLE MIN = 55. SAMPLE MAX = 272. N = 10

PARAMETERS FOR GUMBEL I A = .018554 U = 119.
PARAMETERS FOR LOGNORMAL M = 4.9131 S = .4893
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -39. M = 5.1868 S = .3703
STATISTICS OF LOG(X-A)
MEAN = 5.1868 S.D. = .3703 C.S. = -.1205 C.K. = 3.7616
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0881 B = .3086E+02 LOG(P) = 7.6312
ME= .2062E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	30.		39.		30.		0.		33.	
1.050	60.		61.		58.		0.		58.	
1.250	94.		98.		92.		0.		91.	
2.000	139.		136.		139.		0.		140.	
2.330	151.	14.40	148.	15.60	152.	15.70	0.	0.00	153.	16.60
5.000	200.	15.30	205.	18.00	205.	16.30	0.	0.00	207.	16.30
10.000	241.	16.40	255.	20.90	248.	18.80	0.	0.00	249.	17.90
20.000	280.	17.20	304.	23.70	290.	22.30	0.	0.00	289.	21.50
50.000	330.	18.20	372.	27.30	343.	27.40	0.	0.00	338.	28.10
100.000	367.	18.80	425.	29.80	384.	31.30	0.	0.00	373.	33.90
200.000	405.	19.20	480.	32.20	425.	35.30	0.	0.00	407.	40.10
500.000	454.	19.80	557.	35.10	480.	40.40	0.	0.00	452.	48.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I169.0

LITTLE ROUGE CREEK NEAR LOCUST HILL 02HC028

DRAINAGE AREA : 77.7 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1964 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	22.	7.	-.211	3.351
LN X SERIES	3.04	.40	-1.229	5.979

X(MIN)= 7. CMS. TOTAL SAMPLE SIZE= 19
X(MAX)= 34. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

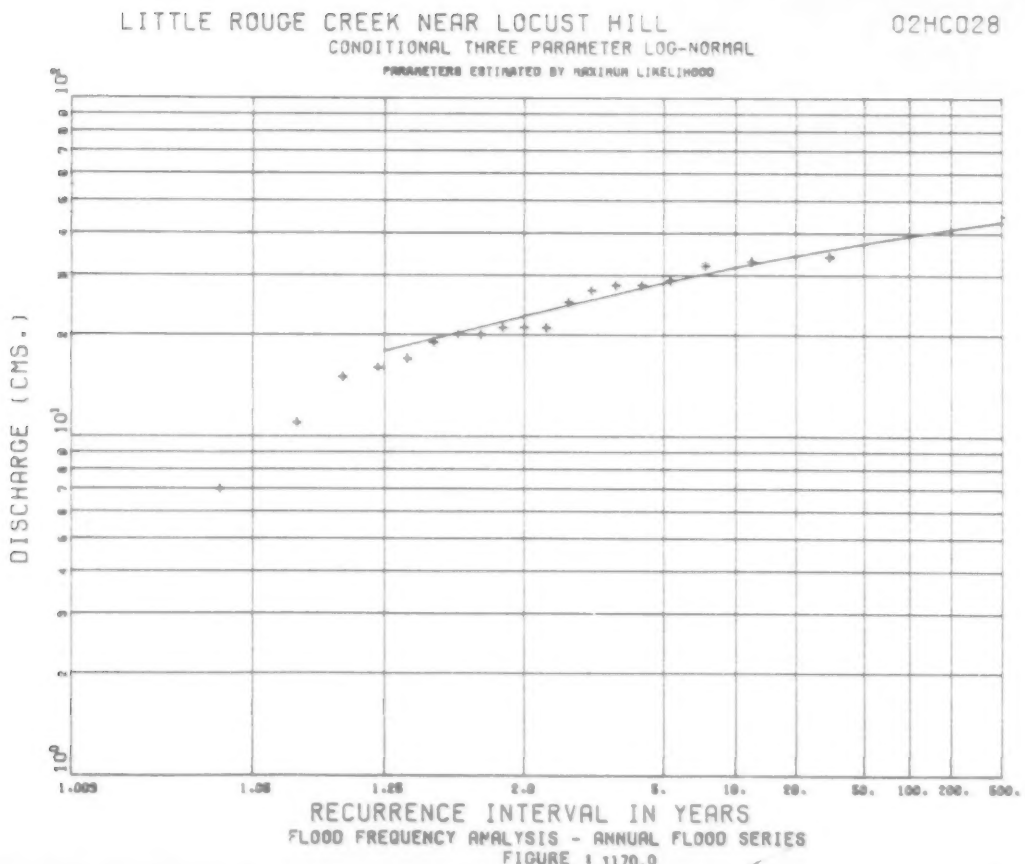
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	23.	7.	.065	2.961
LN X SERIES	3.10	.31	-.533	3.910
LN (X-A) SERIES	4.92	.05	-.016	3.017

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -114.0560 M = 4.9205 S = .0483

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	18.
2.000	.500	23.
2.330	.429	24.
5.000	.200	28.
10.000	.100	32.
20.000	.050	34.
50.000	.021	37.
100.000	.010	39.
200.000	.005	41.
500.000	.002	43.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1170.0

LITTLE WHITE RIVER NEAR BELLINGHAM 02CC005

DRAINAGE AREA : 1960.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1945 - 1982

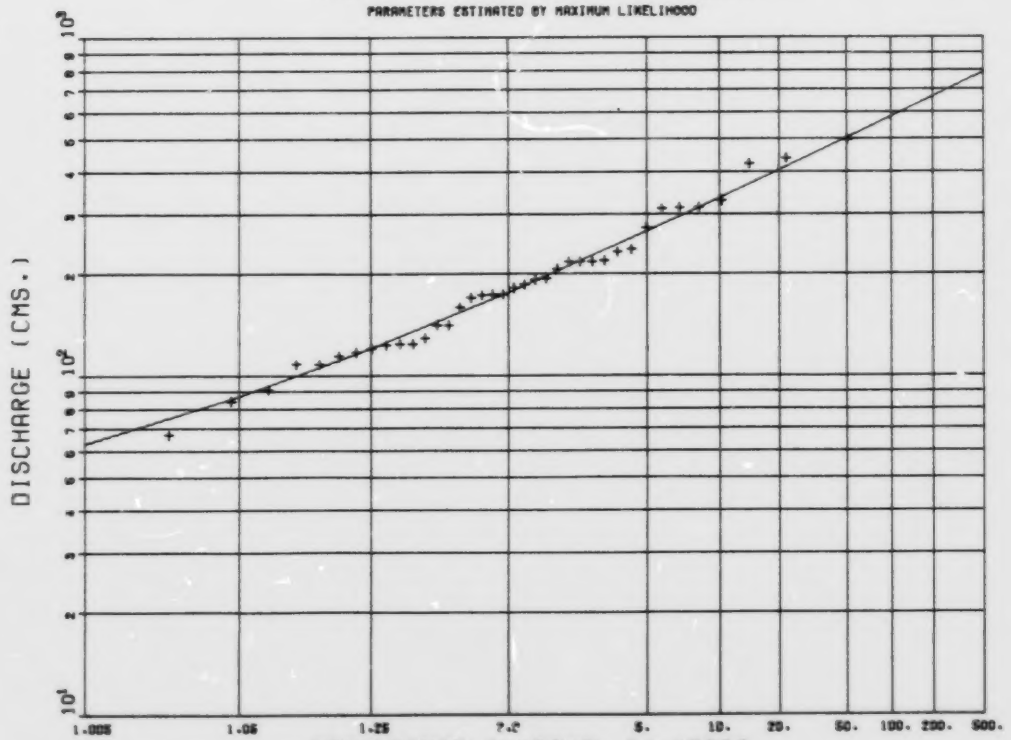
SAMPLE STATISTICS
MEAN = 201. S.D. = 100.5 C.S. = 1.2890 C.K. = 4.7251
SAMPLE STATISTICS (LOGS)
MEAN = 5.1944 S.D. = .4677 C.S. = .2067 C.K. = 2.9908
SAMPLE MIN = 67. SAMPLE MAX = 497. N = 38

PARAMETERS FOR GUMBEL I A = .014388 U = 158.
PARAMETERS FOR LOGNORMAL M = 5.1944 S = .4677
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 29. M = 4.9952 S = .5672
STATISTICS OF LOG(X-A)
MEAN = 4.9952 S.D. = .5672 C.S. = -.0478 C.K. = 3.1199
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0483 B = .9359E+02 LOG(M) = .6696
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1953E+01
A = .0637 B = .5273E+02
LOG(M)F= 1.8372 M = .6279E+01
DISTRIBUTION STATISTICS MEAN = 5.1944 S.D. = .4623 C.S. = .2754

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	42.		54.		63.		62.		59.	
1.050	81.		83.		87.		88.		86.	
1.250	125.		122.		120.		122.		121.	
2.000	183.		180.		176.		176.		177.	
2.330	198.	7.22	196.	7.65	192.	8.24	192.	8.16	193.	8.31
5.000	262.	7.75	267.	8.83	267.	9.56	264.	9.39	266.	9.36
10.000	314.	8.29	328.	10.20	334.	11.70	330.	11.60	331.	11.40
20.000	364.	8.75	389.	11.60	404.	14.20	399.	14.50	400.	14.30
50.000	429.	9.24	471.	13.40	502.	17.70	496.	19.20	496.	19.00
100.000	478.	9.54	535.	14.60	581.	20.30	580.	23.10	574.	23.30
200.000	526.	9.80	601.	15.80	665.	22.80	669.	27.20	659.	27.20
500.000	590.	10.10	693.	17.20	785.	26.20	798.	32.90	781.	33.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

LITTLE WHITE RIVER NEAR BELLINGHAM 02CC005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1171.0

LUTTERAL CREEK NEAR OUSTIC 02GA033

DRAINAGE AREA : 64.8 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1974 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	14.	8.	1.383	6.552
LN X SERIES	2.50	.64	-.839	5.187

X(MIN)= 2. CMS. TOTAL SAMPLE SIZE= 29
X(MAX)= 42. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	15.	8.	1.508	6.877
LN X SERIES	2.56	.55	-.349	4.517
LN (X-A) SERIES	2.77	.44	.032	4.045

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -2.5660 M = 2.7660 S = .4445

FLOOD FREQUENCY REGIME

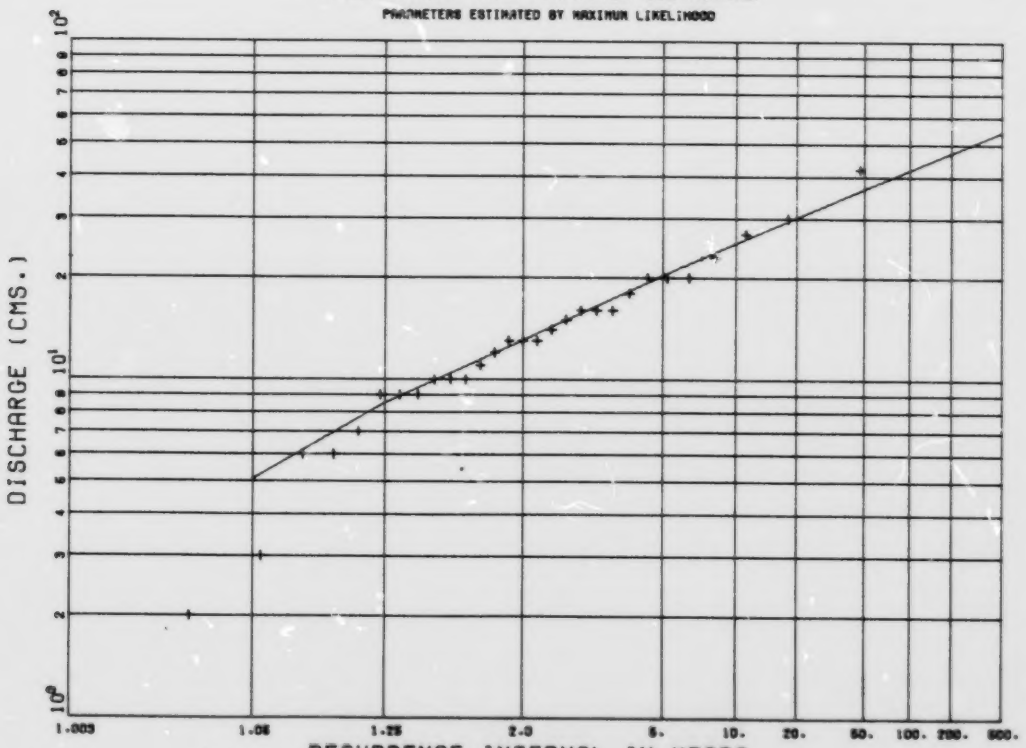
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	5.
1.250	.800	8.
2.000	.500	13.
2.330	.429	14.
5.000	.200	20.
10.000	.100	25.
20.000	.050	30.
50.000	.020	37.
100.000	.010	42.
200.000	.005	47.
500.000	.002	54.

LUTTERAL CREEK NEAR OUSTIC 02GA033

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE :I172.0

LYN CREEK NEAR LYN 02MB006

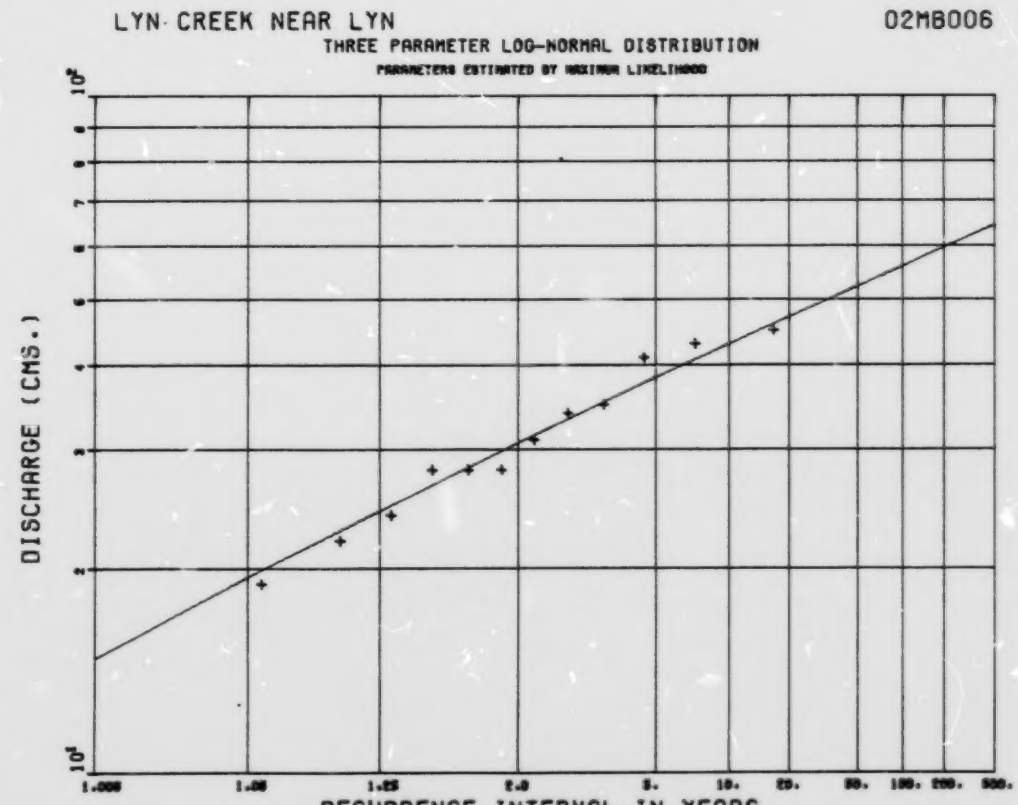
DRAINAGE AREA : 80.0 SQ. KM.
REGULATED FLOW : CLASS 4
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 32. S.D. = 8.3 C.S. = .2901 C.K. = 3.1183
SAMPLE STATISTICS (LOGS)
MEAN = 3.4173 S.D. = .2693 C.S. = -.1469 C.K. = 3.2926
SAMPLE MIN = 19. SAMPLE MAX = 45. N = 12

PARAMETERS FOR GUMBEL I A = .145399 U = 28.
PARAMETERS FOR LOGNORMAL M = 3.4173 S = .2693
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -5. M = 3.5663 S = .2319
STATISTICS OF LOG(X-A)
MEAN = 3.5663 S.D. = .2319 C.S. = -.0815 C.K. = 3.2359
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0198 B = .1855E+03 LOG(M) = 7.0851
ME= .1194E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0764 B = .1193E+02
LOG(M)F= 4.3287 M = .7584E+02
DISTRIBUTION STATISTICS MEAN = 3.4173 S.D. = .2638 C.S. = -.5790

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	16.		15.		15.		13.		15.	
1.050	20.		20.		19.		19.		19.	
1.250	24.		24.		24.		25.		24.	
2.000	30.		31.		31.		34.		31.	
2.330	32.	7.97	32.	7.84	32.	8.25	33.	7.78	32.	8.37
5.000	38.	9.43	38.	9.05	38.	8.77	38.	7.44	38.	8.74
10.000	43.	10.60	43.	10.50	43.	10.30	42.	7.73	43.	9.99
20.000	48.	11.70	48.	11.90	47.	12.40	45.	8.59	47.	12.10
50.000	55.	12.80	55.	13.70	52.	15.60	48.	10.40	52.	15.70
100.000	59.	13.50	57.	15.00	56.	18.20	50.	12.20	55.	18.80
200.000	64.	14.20	61.	16.20	60.	20.80	52.	14.10	59.	22.10
500.000	70.	14.90	66.	17.60	64.	24.30	55.	16.70	63.	26.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE # I173.0

LYNDE CREEK NEAR WHITBY 02HC018

DRAINAGE AREA = 106.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 29. S.D. = 10.3 C.S. = .8236 C.K. = 5.5825
SAMPLE STATISTICS (LOGS)
MEAN = 3.3025 S.D. = .3672 C.S. = -.4178 C.K. = 4.2636
SAMPLE MIN = 12. SAMPLE MAX = 56. N = 17

PARAMETERS FOR GUMBEL I A = .117982 U = 24.
PARAMETERS FOR LOGNORMAL M = 3.3025 S = .3672
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -15. M = 3.7543 S = .2310
STATISTICS OF LOG(X-A)
MEAN = 3.7543 S.D. = .2310 C.S. = .0009 C.K. = 4.2091
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0767 B = .2294E+02 LOG(M) = 5.0814
ME= .1578E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0511 B = .3393E+02
LOG(M)= 5.1744 M = .2158E+03
DISTRIBUTION STATISTICS MEAN = 3.3025 S.D. = .3557 C.S. = -.3434

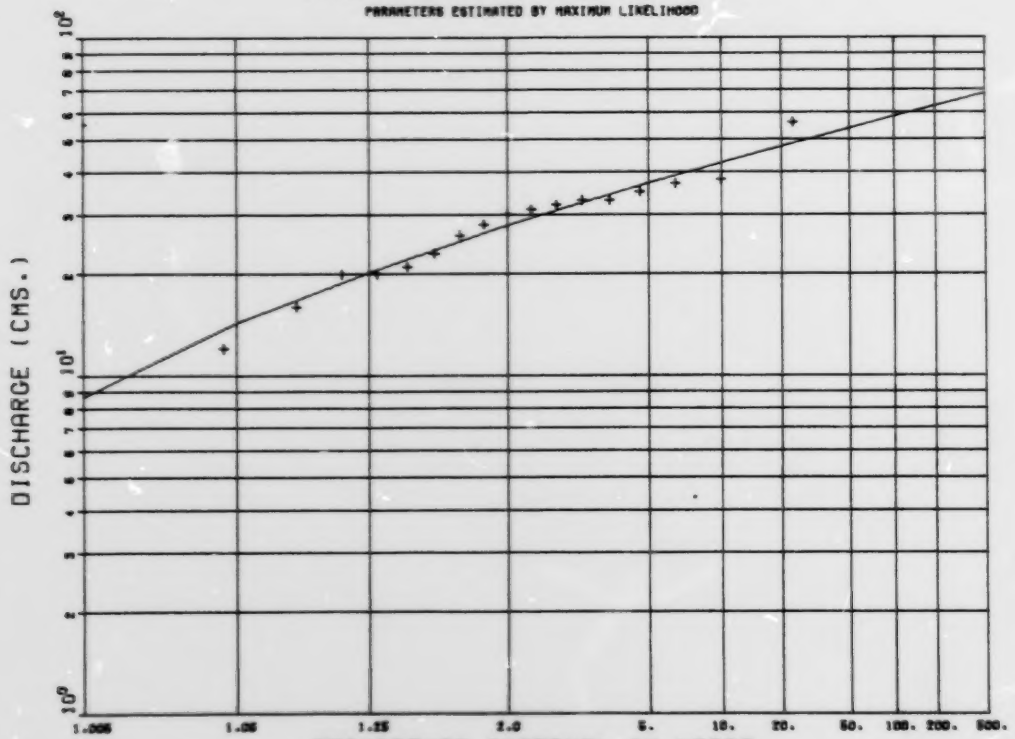
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	10.		11.		3.		10.		9.	
1.050	15.		15.		14.		15.		14.	
1.250	20.		20.		20.		20.		20.	
2.000	27.		27.		28.		28.		28.	
2.330	29.	8.96	29.	8.98	30.	9.04	30.	9.10	30.	9.57
5.000	37.	10.00	37.	10.40	37.	9.16	37.	9.13	37.	9.22
10.000	43.	11.00	44.	12.00	43.	10.50	42.	10.00	43.	10.00
20.000	49.	11.80	50.	13.70	48.	12.40	47.	11.70	48.	12.00
50.000	57.	12.60	58.	15.70	54.	15.30	53.	14.00	55.	15.80
100.000	63.	13.10	64.	17.10	58.	17.60	57.	17.50	57.	19.20
200.000	69.	13.60	70.	18.50	63.	20.00	61.	20.40	61.	22.80
500.000	77.	14.10	78.	20.20	68.	23.10	66.	24.50	65.	27.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

LYNDE CREEK NEAR WHITBY 02HC018

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I174.0

LYNN RIVER AT SIMCOE 02GC008

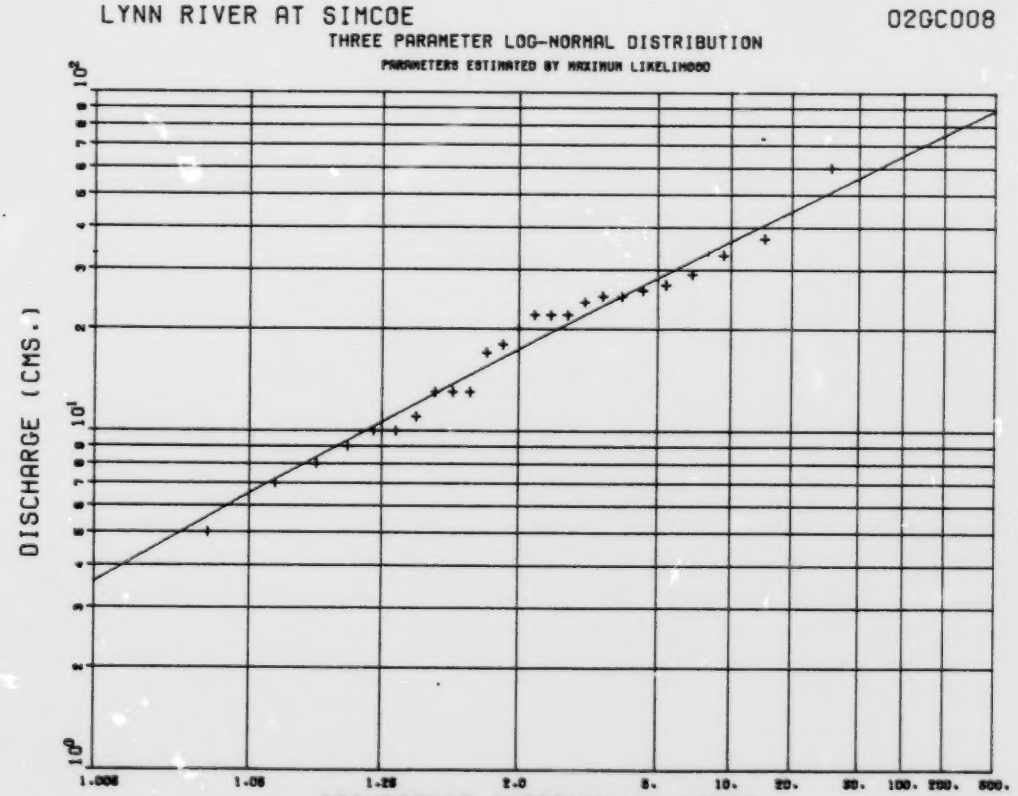
DRAINAGE AREA : 134.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1958 - 1982

SAMPLE STATISTICS
MEAN = 20. S.D. = 11.9 C.S. = 1.5538 C.K. = 7.4000
SAMPLE STATISTICS (LOGS)
MEAN = 2.8504 S.D. = .5838 C.S. = -.1756 C.K. = 3.1885
SAMPLE MIN = 5. SAMPLE MAX = 60. N = 25

PARAMETERS FOR GUMBEL I A = .119140 U = 15.
PARAMETERS FOR LOGNORMAL M = 2.8504 S = .5838
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 2.9056 S = .5522
STATISTICS OF LOG(X-A)
MEAN = 2.9056 S.D. = .5522 C.S. = -.1049 C.K. = 3.1713
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0513 B = .1297E+03 LOG(M) = 9.4991
ME= .1335E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0630 B = .3251E+02
LOG(M)F= 8.0508 M = .3136E+04
DISTRIBUTION STATISTICS MEAN = 2.8504 S.D. = .5725 C.S. = -.2202

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		4.		4.		4.		3.	
1.050	6.		7.		7.		7.		6.	
1.250	11.		11.		11.		11.		11.	
2.000	16.		17.		17.		16.		16.	
5.330	20.	10.60	19.	11.80	19.	12.10	20.	12.20	21.	12.60
10.000	25.	10.90	24.	13.60	24.	13.20	25.	12.60	26.	13.00
20.000	34.	11.40	37.	15.80	36.	15.70	36.	14.20	36.	14.80
50.000	40.	11.80	45.	17.90	45.	18.70	43.	16.90	44.	17.80
100.000	48.	12.30	57.	20.60	56.	22.90	52.	21.60	54.	23.10
200.000	54.	12.60	67.	22.50	65.	26.00	60.	25.80	62.	27.70
500.000	60.	12.90	78.	24.30	75.	29.10	67.	30.20	71.	32.60
	67.	13.10	93.	26.50	89.	33.10	77.	36.30	82.	39.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I175.0

MAD RIVER NEAR GLENCAIRN 02ED005

DRAINAGE AREA : 295.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1964 - 1982

SAMPLE STATISTICS
MEAN = 59. S.D. = 26.5 C.S. = 1.2131 C.K. = 5.1379
SAMPLE STATISTICS (LOGS)
MEAN = 3.9895 S.D. = .4335 C.S. = .0019 C.K. = 3.8866
SAMPLE MIN = 24. SAMPLE MAX = 129. N = 19

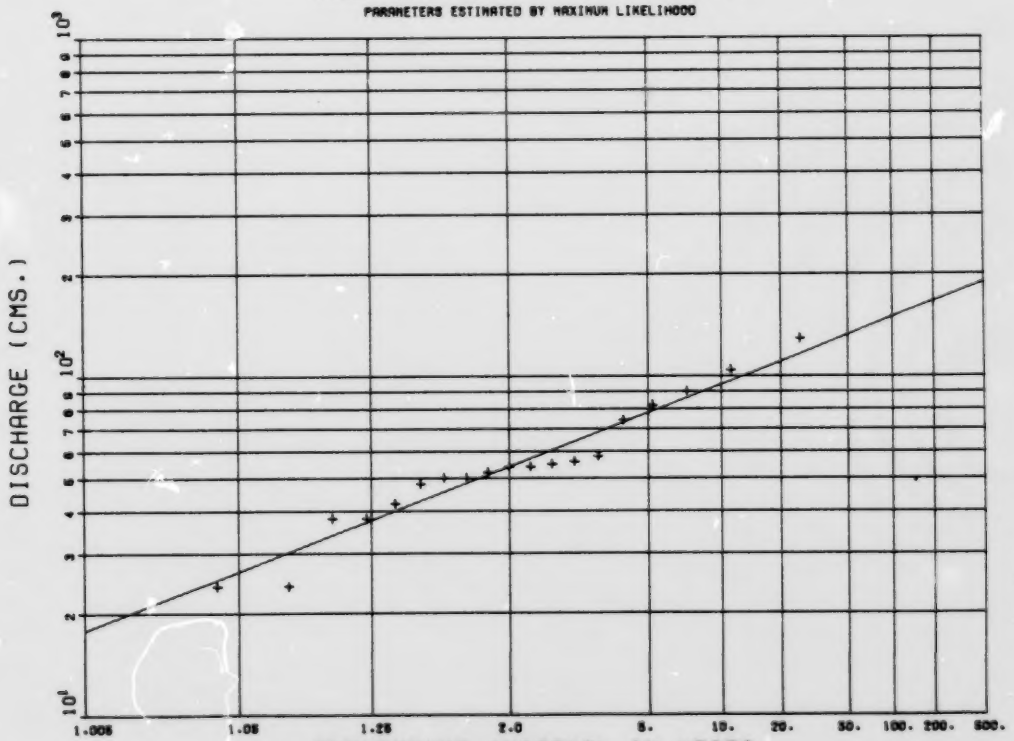
PARAMETERS FOR GUMBEL I A = .052205 U = 48.
PARAMETERS FOR LOGNORMAL P = 3.9895 S = .4335
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 3.9791 S = .4380
STATISTICS OF LOG(X-A)
MEAN = 3.9791 S.D. = .4380 C.S. = -.0120 C.K. = 3.8916
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0004 B = .1267E+07 LOG(M) = *******
ME= .7590-210

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	16.		18.		18.		0.		18.	
1.050	26.		27.		27.		0.		27.	
1.250	39.		38.		38.		0.		38.	
2.000	55.		54.		54.		0.		54.	
2.330	59.	9.50	58.	10.00	58.	10.60	0.	0.00	58.	10.80
5.000	76.	10.40	78.	11.60	78.	11.60	0.	0.00	78.	11.60
10.000	91.	11.20	94.	13.40	94.	13.90	0.	0.00	94.	13.70
20.000	105.	11.90	110.	15.30	110.	16.70	0.	0.00	110.	16.80
50.000	122.	12.60	132.	17.50	132.	20.80	0.	0.00	132.	21.90
100.000	136.	13.10	148.	19.10	149.	23.90	0.	0.00	148.	26.20
200.000	149.	13.50	165.	20.70	166.	27.00	0.	0.00	165.	30.90
500.000	167.	13.90	188.	22.60	189.	31.10	0.	0.00	188.	37.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MAD RIVER NEAR GLENCAIRN 02ED005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I176.0

MADAWASKA RIVER AT WHITNEY - 02KD006

DRAINAGE AREA : 1010.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1942 - 1957

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	88.	52.	.617	3.323
LN X SERIES	4.28	.70	-.797	5.229

X(MIN)= 13. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 191. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	93.	50.	.697	3.285
LN X SERIES	4.40	.54	.034	3.063
LN (X-A) SERIES	4.13	.71	-.233	3.386

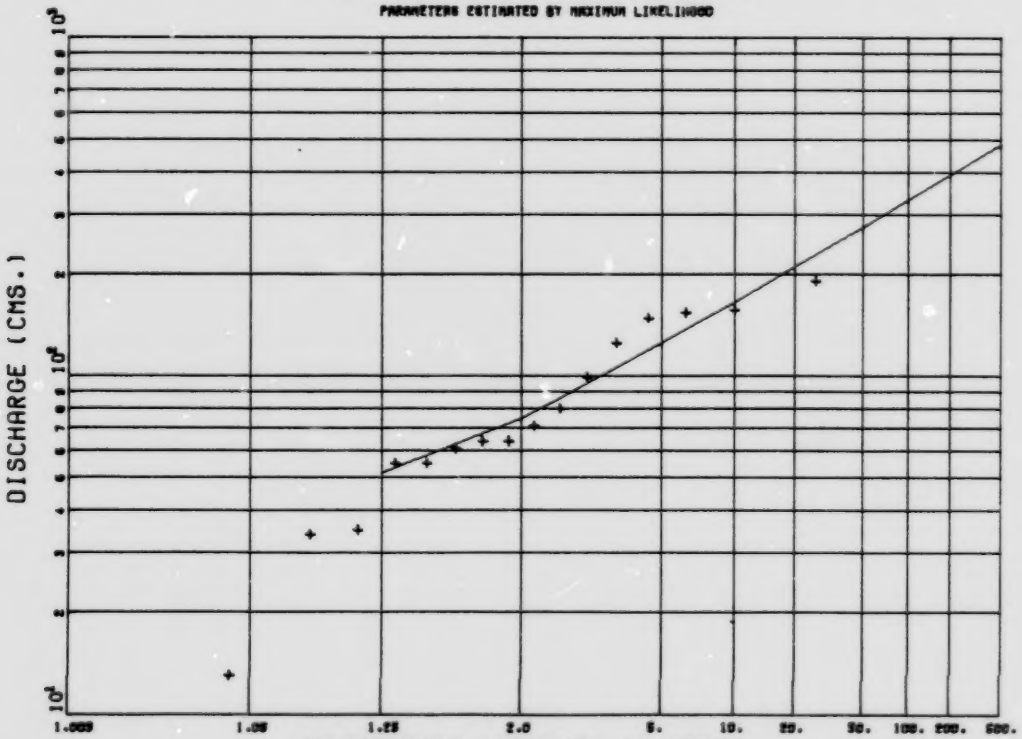
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 15.9583 M = 4.1283 S = .7052

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	51.
2.000	.500	75.
2.330	.429	83.
5.000	.200	125.
10.000	.100	155.
20.000	.050	210.
50.000	.020	275.
100.000	.010	331.
200.000	.005	392.
500.000	.002	482.

MADAWASKA RIVER AT WHITNEY - 02KD006
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1177.0

MADAWASKA RIVER AT BARK LAKE DAM 02KD007

DRAINAGE AREA : 2720.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1943 - 1982

SAMPLE STATISTICS
MEAN = 118. S.D. = 38.8 C.S. = 1.1034 C.K. = 4.3573
SAMPLE STATISTICS (LOGS)
MEAN = 4.7181 S.D. = .3104 C.S. = .3313 C.K. = 3.1011
SAMPLE MIN = 60. SAMPLE MAX = 229. N = 40

PARAMETERS FOR GUMBEL I A = .035074 U = 100.
PARAMETERS FOR LOGNORMAL P = 4.7181 S = .3104
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 34. M = 4.3314 S = .4512
STATISTICS OF LOG(X-A)
MEAN = 4.3314 S.D. = .4512 C.S. = -.0335 C.K. = 3.1457
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0914 B = .3645E+02 LOG(M) = 2.8439
ME= .1718E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0638 B = .2323E+02
LOG(M)= 3.2361 M = .2543E+02
DISTRIBUTION STATISTICS MEAN = 4.7181 S.D. = .3075 C.S. = .4150

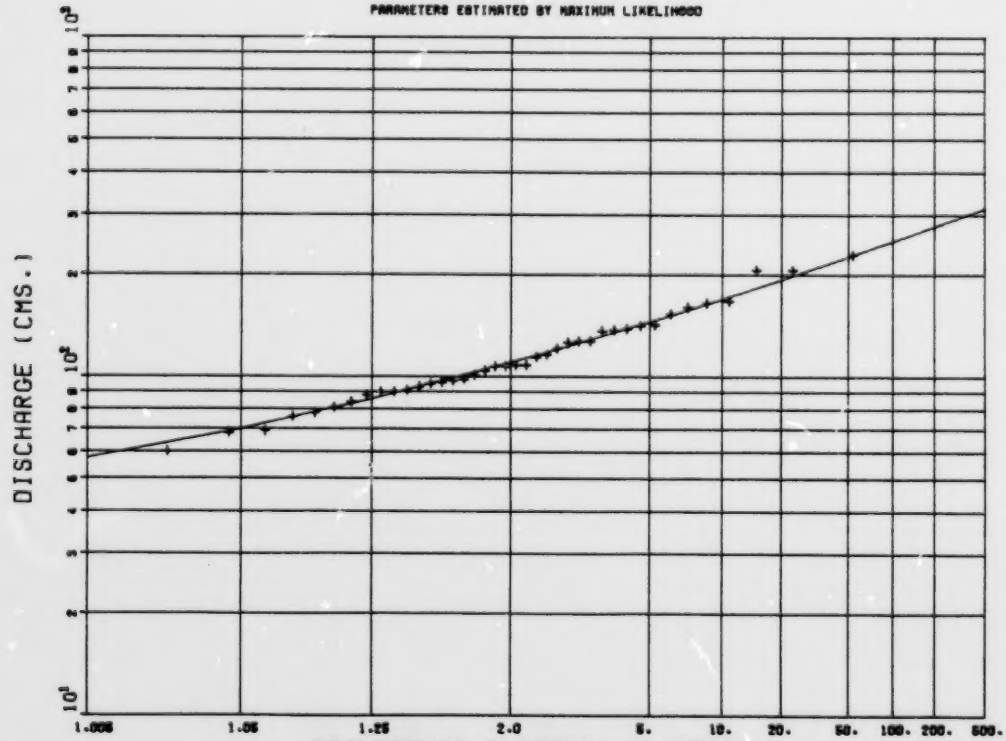
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	53.		50.		57.		57.		55.	
1.050	69.		67.		70.		70.		69.	
1.250	87.		86.		86.		86.		85.	
2.000	111.		112.		110.		110.		110.	
2.330	117.	4.89	118.	4.95	116.	5.38	116.	5.28	116.	5.43
5.000	143.	5.67	145.	5.71	145.	6.38	144.	6.28	144.	6.24
10.000	165.	6.33	167.	6.63	169.	7.54	168.	7.90	168.	7.76
20.000	185.	6.89	187.	7.53	193.	9.04	192.	10.00	192.	9.91
50.000	212.	7.49	212.	8.66	226.	12.50	224.	13.30	224.	13.40
100.000	232.	7.87	230.	9.45	251.	14.70	251.	16.30	248.	16.20
200.000	251.	8.19	249.	10.20	277.	16.80	279.	19.80	274.	19.30
500.000	278.	8.56	274.	11.10	313.	19.60	318.	22.80	311.	23.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MADAWASKA RIVER AT BARK LAKE DAM 02KD007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I178.0

MADAWASKA RIVER AT CALABOGIE 02KE003

DRAINAGE AREA = 8060.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1938 - 1951

SAMPLE STATISTICS
MEAN = 400. S.D. = 200.9 C.S. = 1.1275 C.K. = 5.0280
SAMPLE STATISTICS (LOGS)
MEAN = 5.8791 S.D. = .4909 C.S. = .0320 C.K. = 3.6790
SAMPLE MIN = 143. SAMPLE MAX = 883. N = 14

PARAMETERS FOR GUMBEL I A = .007032 U = 313.
PARAMETERS FOR LOGNORMAL M = 5.9791 S = .4909
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 29. M = 5.7823 S = .5402
STATISTICS OF LOG(X-A)
MEAN = 5.7823 S.D. = .5402 C.S. = -.0893 C.K. = 3.7532
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0078 B = .3917E+04 LOG(M) =********
ME= .1620E-10
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0103 B = .1918E+04
LOG(M)F=******** M = .3593E-06
DISTRIBUTION STATISTICS MEAN = 5.8791 S.D. = .4731 C.S. = .0457

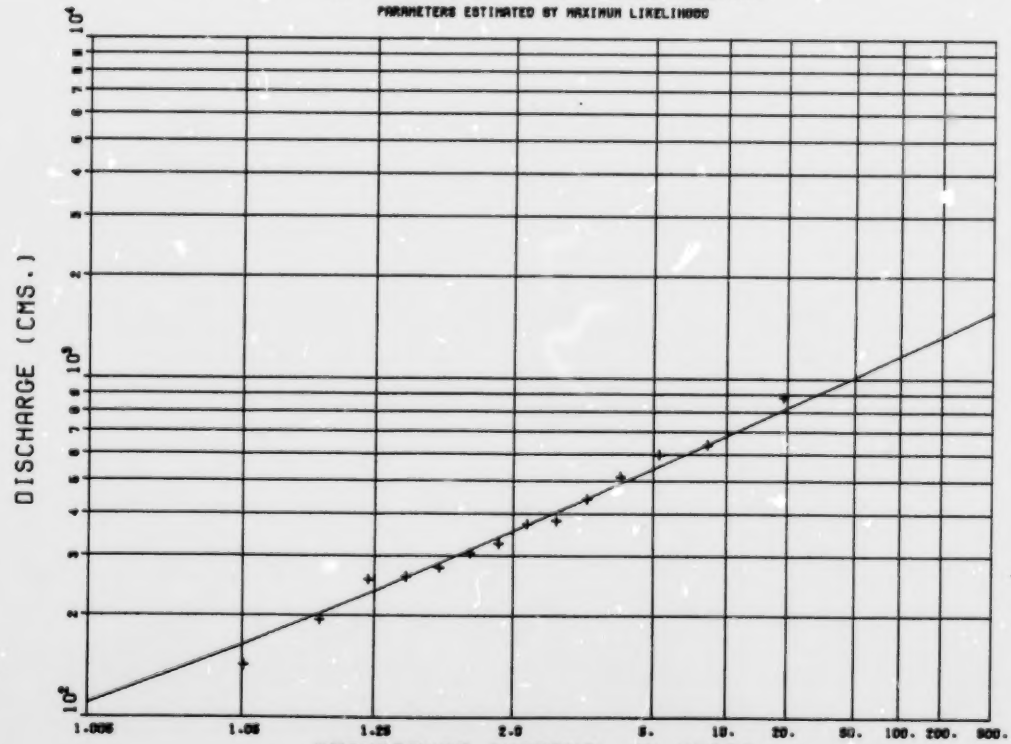
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	76.		101.		110.		108.		102.	
1.050	155.		159.		163.		165.		160.	
1.250	245.		236.		235.		240.		236.	
2.000	365.		357.		354.		356.		357.	
5.000	395.	12.20	390.	13.20	386.	14.10	388.	13.70	389.	14.20
10.000	526.	13.00	540.	15.30	541.	15.80	532.	15.00	541.	15.50
20.000	633.	13.90	671.	17.70	678.	19.20	657.	17.70	672.	18.30
50.000	735.	14.60	802.	20.10	818.	23.10	783.	21.60	805.	22.50
100.000	866.	15.40	900.	23.10	1010.	28.70	956.	25.60	983.	27.40
200.000	967.	15.90	1120.	25.30	1170.	32.80	1090.	34.30	1130.	35.30
500.000	1070.	16.30	1270.	27.30	1330.	36.80	1230.	40.40	1280.	41.50
	1200.	16.70	1470.	29.80	1571.	42.20	1430.	49.90	1500.	50.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MADAWASKA RIVER AT CALABOGIE 02KE003

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I179.0

MADAWASKA RIVER AT MADAWASKA 02KD001

DRAINAGE AREA : 1370.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1916 - 1942

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	106.	43.	.849	4.229
LN X SERIES	4.51	.45	-.448	4.277

X(MIN)= 28. CMS. TOTAL SAMPLE SIZE= 27
X(MAX)= 210. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

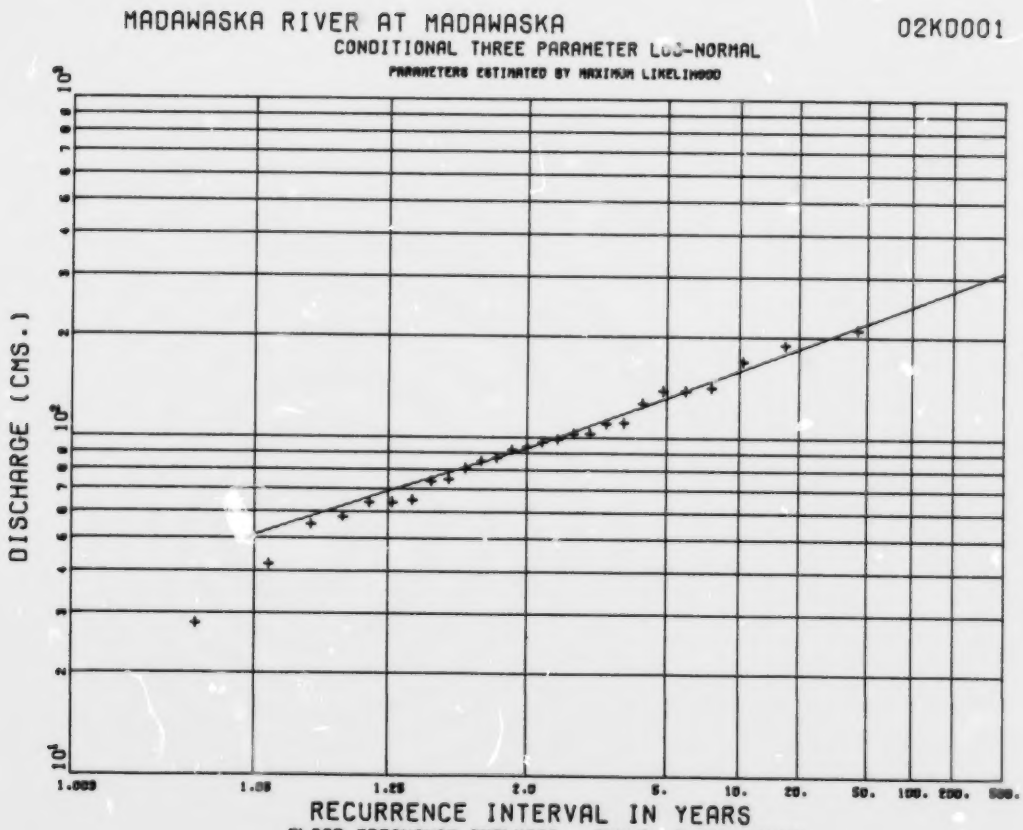
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	103.	42.	1.004	4.356
LN X SERIES	4.56	.39	.093	3.326
LN (X-4) SERIES	4.42	.45	-.052	3.411

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 11.2311 M = 4.4208 S = .4488

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	51.
1.250	.800	69.
2.000	.500	93.
2.330	.429	100.
5.000	.200	131.
10.000	.100	158.
20.000	.050	184.
50.000	.020	219.
100.000	.010	246.
200.000	.005	274.
500.000	.002	312.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I180.0

MADAWASKA RIVER AT PALMER RAPIDS 02KD004

DRAINAGE AREA : 5810.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1930 - 1982

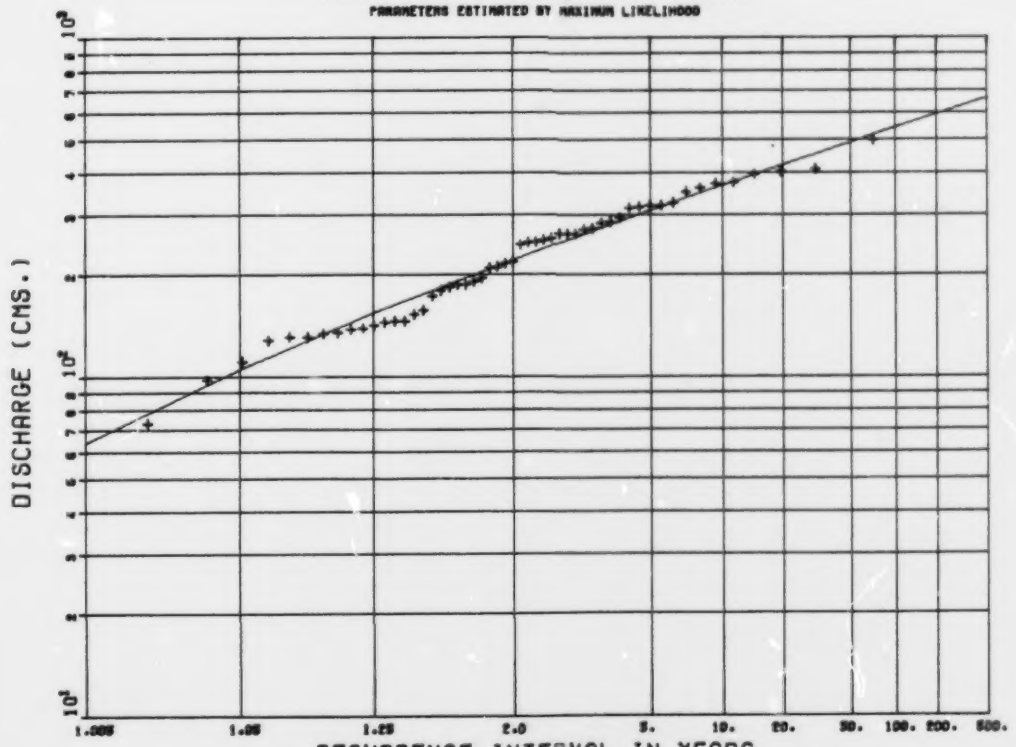
SAMPLE STATISTICS
MEAN = 235. S.D. = 94.9 C.S. = .5445 C.K. = 2.9182
SAMPLE STATISTICS (LOGS)
MEAN = 5.3777 S.D. = .4208 C.S. = -.2574 C.K. = 2.6714
SAMPLE MIN = 73. SAMPLE MAX = 498. N = 53

PARAMETERS FOR GUMBEL I A = .012938 U = 191.
PARAMETERS FOR LOGNORMAL M = 5.3777 S = .4208
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -49. M = 5.5961 S = .3372
STATISTICS OF LOG(X-A)
MEAN = 5.5961 S.D. = .3372 C.S. = -.0860 C.K. = 2.4717
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0542 B = .6037E+02 LOG(M) = 8.6475
ME= .5696E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1060 B = .1580E+02
LOG(M)F= 7.1526 M = .1156E+04
DISTRIBUTION STATISTICS MEAN = 5.3777 S.D. = .4213 C.S. = -.5031

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	62.		73.		64.		60.		66.	
1.050	105.		108.		105.		103.		105.	
1.250	154.		152.		154.		154.		153.	
2.000	219.		217.		221.		224.		220.	
2.330	236.	5.72	233.	5.83	237.	5.97	241.	5.98	237.	6.21
5.000	307.	6.24	309.	6.73	309.	6.25	311.	5.81	310.	6.29
10.000	365.	6.73	371.	7.80	366.	7.29	361.	6.14	367.	7.05
20.000	420.	7.14	433.	8.87	421.	8.68	426.	6.95	419.	8.45
50.000	492.	7.58	514.	10.20	489.	10.80	498.	8.56	485.	11.00
100.000	546.	7.85	576.	11.10	541.	12.40	494.	10.30	532.	13.20
200.000	600.	8.08	640.	12.00	593.	14.00	527.	11.70	579.	15.50
500.000	671.	8.34	728.	13.10	662.	16.10	568.	13.90	639.	18.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MADAWASKA RIVER AT PALMER RAPIDS 02KD004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I101.0

MADAWASKA RIVER AT STEWARTVILLE 02KE005

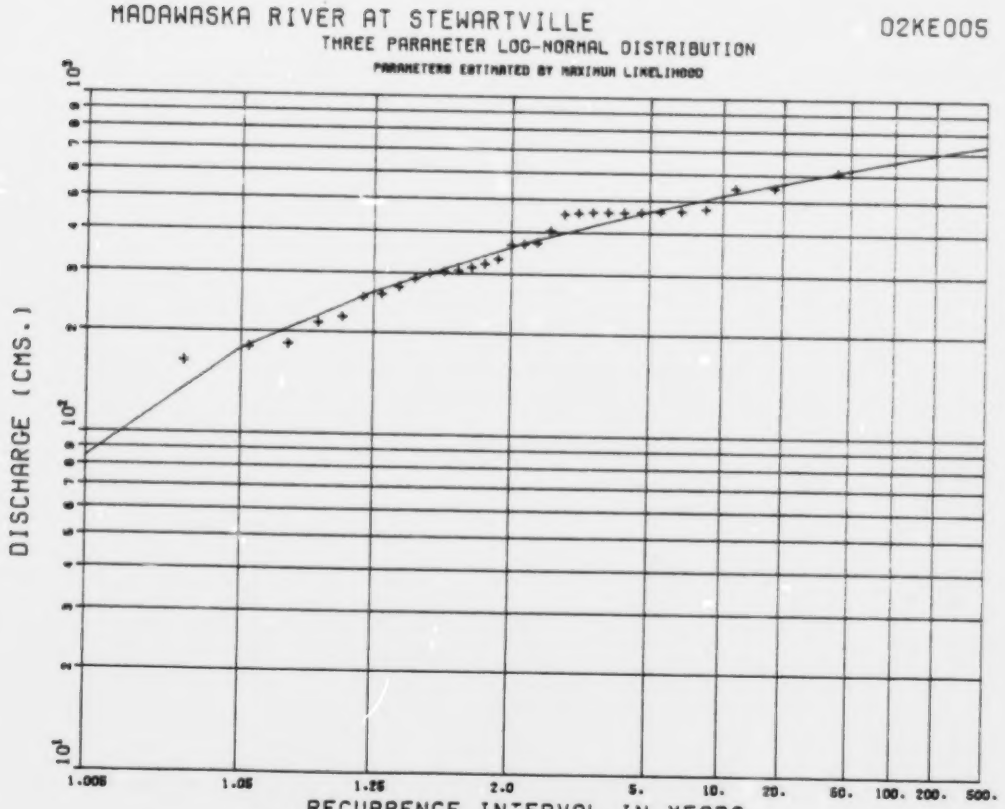
DRAINAGE AREA : 8160.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1949 - 1979

SAMPLE STATISTICS
MEAN = 364. S.D. = 117.9 C.S. = .1036 C.K. = 2.5045
SAMPLE STATISTICS (LOGS)
MEAN = 5.8404 S.D. = .3501 C.S. = -.4328 C.K. = 2.7533
SAMPLE MIN = 163. SAMPLE MAX = 611. N = 31

PARAMETERS FOR GUMBEL I A = .029550 U = 306.
PARAMETERS FOR LOGNORMAL P = 5.8404 S = .3501
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1195. N = 7.3490 S = .0757
STATISTICS OF LOG(X-A)
MEAN = 7.3490 S.D. = .0757 C.S. = -.0242 C.K. = 2.4556
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0845 B = .1716E+02 LOG(M) = 7.2907
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1467E+04
A = -.1742 B = .4229E+01
LOG(M)= 6.5754 M = .7172E+03
DISTRIBUTION STATISTICS MEAN = 5.8404 S.D. = .3578 C.S. = -.9736

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	132.		140.		84.		39.		1:3.	
1.050	196.		193.		177.		176.		185.	
1.250	257.		256.		261.		252.		254.	
2.000	345.		344.		359.		344.		354.	
2.330	367.	6.50	366.	6.34	380.	6.08	365.	5.85	376.	6.70
5.000	463.	7.71	462.	7.32	463.	6.78	466.	6.33	469.	8.18
10.000	542.	8.02	539.	8.43	513.	6.20	516.	5.03	527.	8.86
20.000	617.	8.51	612.	9.65	565.	7.14	553.	4.39	581.	9.24
50.000	715.	9.25	706.	11.10	621.	8.68	591.	5.32	643.	11.00
100.000	788.	9.65	776.	12.10	659.	9.63	614.	5.85	685.	12.40
200.000	861.	9.98	847.	13.10	694.	11.20	632.	6.46	726.	15.90
500.000	957.	10.40	943.	14.30	738.	12.90	652.	7.44	772.	19.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I182.0

MADAWASKA RIVER NEAR ARNPRIOR 02KE002

DRAINAGE AREA : 8260.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1924 - 1950

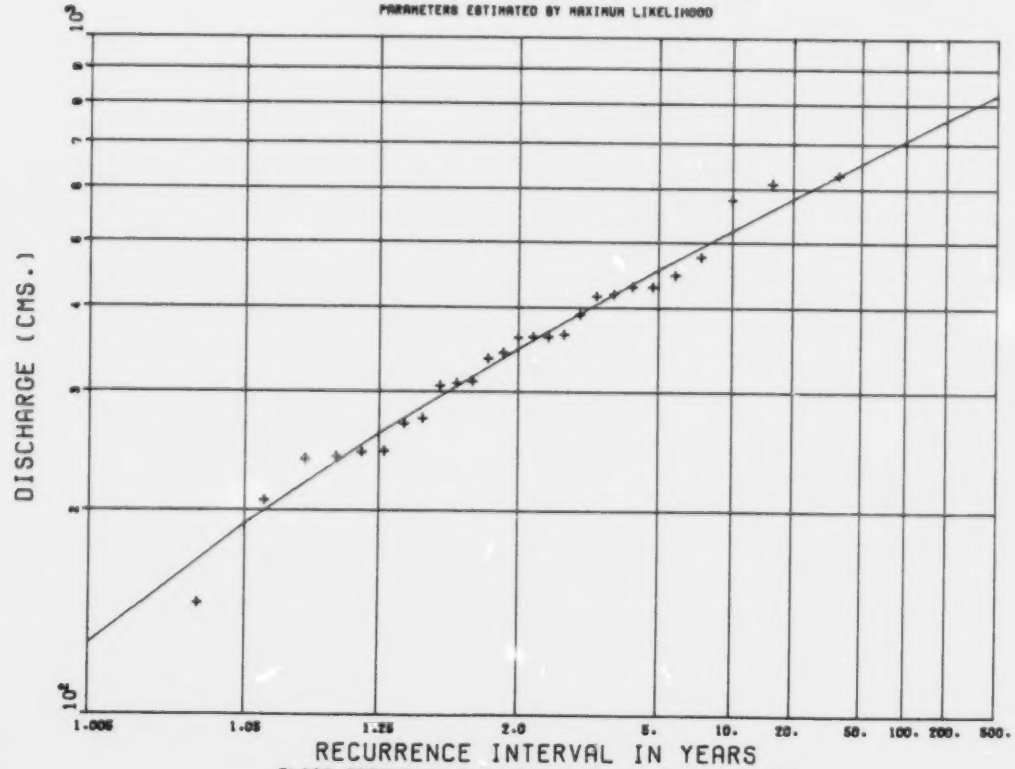
SAMPLE STATISTICS
MEAN = 361. S.D. = 119.4 C.S. = .6362 C.K. = 3.6309
SAMPLE STATISTICS (LOGS)
MEAN = 5.8352 S.D. = .3384 C.S. = -.2979 C.K. = 3.7185
SAMPLE MIN = 146. SAMPLE MAX = 629. N = 27

PARAMETERS FOR GUMBEL I A = .010097 U = 306.
PARAMETERS FOR LOGNORMAL M = 5.8352 S = .3384
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -123. M = 6.1541 S = .2445
STATISTICS OF LOG(X-A)
MEAN = 6.1541 S.D. = .2445 C.S. = -.0145 C.K. = 3.4059
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0504 B = .4506E+02 LOG(M) = 8.1070
ME= .3317E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0514 B = .4178E+02
LOG(M)= 7.9839 M = .2933E+04
DISTRIBUTION STATISTICS MEAN = 5.8352 S.D. = .3324 C.S. = -.3094

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	141.		143.		127.		132.		130.	
1.050	196.		196.		191.		193.		191.	
1.250	259.		257.		260.		260.		259.	
2.000	342.		342.		347.		348.		348.	
5.330	363.	6.66	363.	6.56	368.	6.74	369.	6.77	369.	7.00
5.000	454.	7.56	455.	7.58	455.	6.97	454.	6.85	457.	7.00
10.000	529.	8.33	528.	8.79	520.	8.06	517.	7.56	522.	7.78
20.000	600.	8.99	597.	9.99	580.	9.60	573.	8.48	579.	9.32
50.000	692.	9.68	686.	11.50	654.	12.00	640.	11.30	649.	12.10
100.000	761.	10.10	752.	12.50	708.	13.80	687.	13.40	698.	14.60
200.000	830.	10.50	815.	13.50	760.	15.70	732.	15.60	745.	17.20
500.000	921.	10.90	907.	14.80	828.	18.20	788.	18.80	804.	20.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MADAWASKA RIVER NEAR ARNPRIOR 02KE002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I183.0

MAGNETAWAN RIVER AT MAPLE ISLAND 02EA008

DRAINAGE AREA : 7880.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1946 - 1957

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	127.	42.	-.331	3.127
LN X SERIES	4.78	.42	-1.631	9.411

X(MIN)= 40. CMS. TOTAL SAMPLE SIZE= 12
X(MAX)= 199. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	135.	33.	-.670	5.436
LN X SERIES	4.88	.25	-.366	5.111
LN (X-A) SERIES	4.12	.24	-.039	5.103

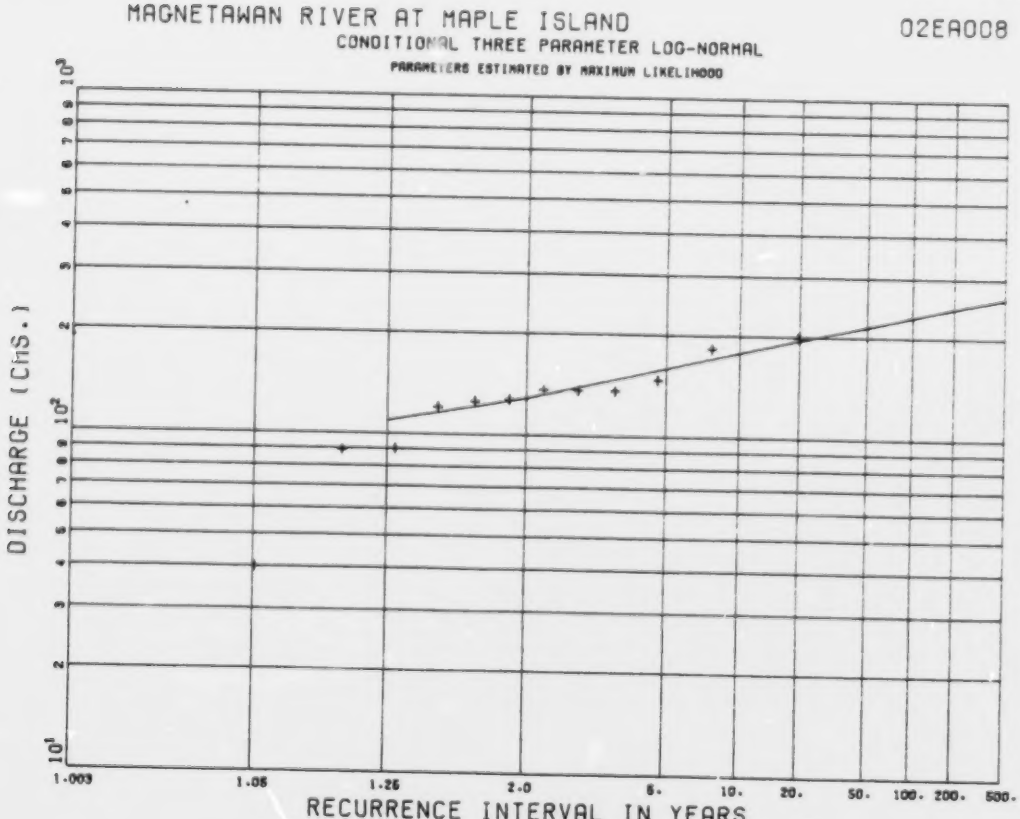
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -5.6081 W = 4.9228 S = .2356

FLOOD FREQUENCY RECIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	103.
2.000	.500	128.
5.330	.429	134.
5.000	.200	159.
10.000	.100	174.
20.000	.050	190.
50.000	.020	215.
100.000	.010	230.
200.000	.005	245.
500.000	.002	263.

DATA FAILED NONPARAMETRIC TESTS



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I184.1

MAGNETAWAN RIVER NEAR BURK+S FALLS 02EA006

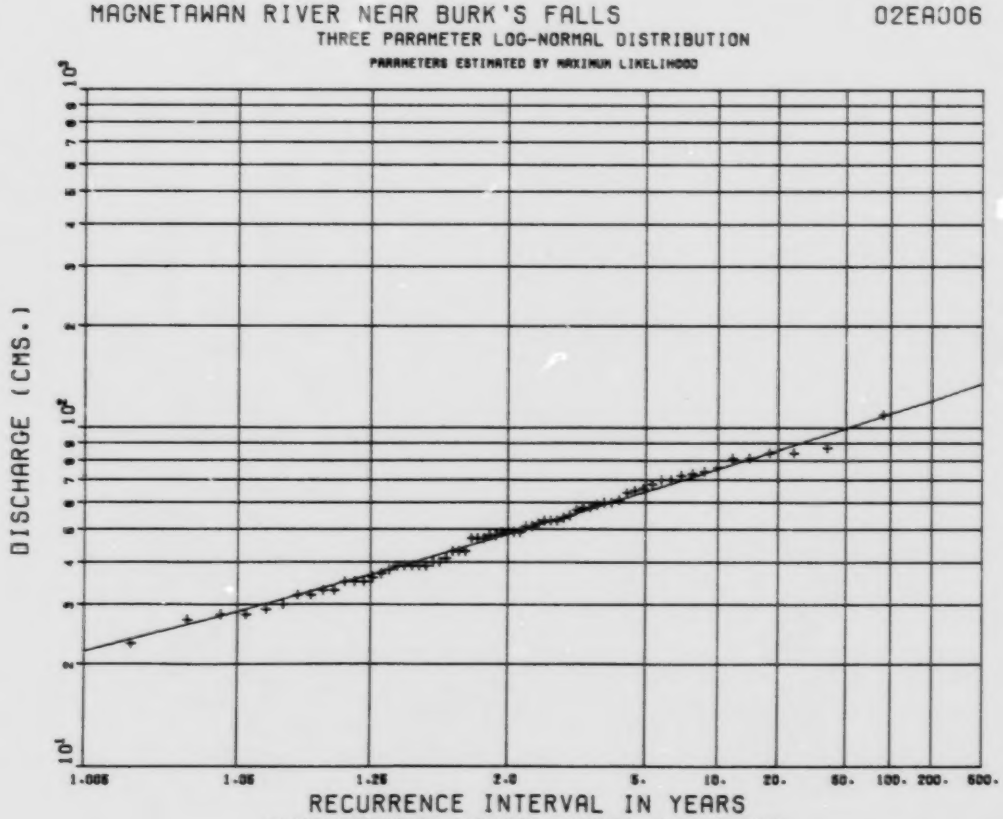
DRAINAGE AREA : 650.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1916 - 1982

SAMPLE STATISTICS
MEAN = 51. S.D. = 17.5 C.S. = .8106 C.K. = 3.7023
SAMPLE STATISTICS (LOGS)
MEAN = 3.8858 S.D. = .3342 C.S. = .0472 C.K. = 2.6276
SAMPLE MIN = 23. SAMPLE MAX = 109. N = 67

PARAMETERS FOR GUMBEL I A = .072742 U = 43.
PARAMETERS FOR LOGNORMAL M = 3.8858 S = .3342
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 6. M = 3.7336 S = .3886
STATISTICS OF LOG(X-A)
MEAN = 3.7336 S.D. = .3886 C.S. = -.0714 C.K. = 2.6621
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0079 B = .1796E+04 LOG(M) = *******
ME= .3440E-04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0134 B = .6172E+03
LOG(M')F=-4.3564 M = .1282E-01
DISTRIBUTION STATISTICS MEAN = 3.8858 S.D. = .3318 C.S. = .0805

RETURN PERIOD	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	21.		21.		22.		21.		21.	
1.050	28.		28.		29.		28.		28.	
1.250	37.		37.		37.		37.		37.	
2.000	49.		49.		48.		49.		49.	
2.330	51.	4.15	52.	4.12	51.	4.42	51.	4.40	52.	4.43
5.000	64.	4.72	65.	4.75	65.	4.97	64.	4.84	65.	4.84
10.000	74.	5.22	75.	5.51	75.	6.02	75.	5.77	75.	5.73
20.000	84.	5.64	84.	6.26	86.	7.35	85.	7.13	85.	7.06
50.000	97.	6.18	97.	7.20	99.	9.29	98.	9.36	98.	9.25
100.000	107.	6.36	106.	7.86	110.	10.80	107.	11.20	107.	11.10
200.000	116.	6.60	115.	8.48	120.	12.30	117.	13.20	117.	13.10
500.000	129.	6.87	128.	9.26	135.	14.30	131.	16.00	130.	15.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I184.0

MAGPIE RIVER AT STEEP HILL FALLS 02BD001

DRAINAGE AREA : 1648.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1921 - 1939

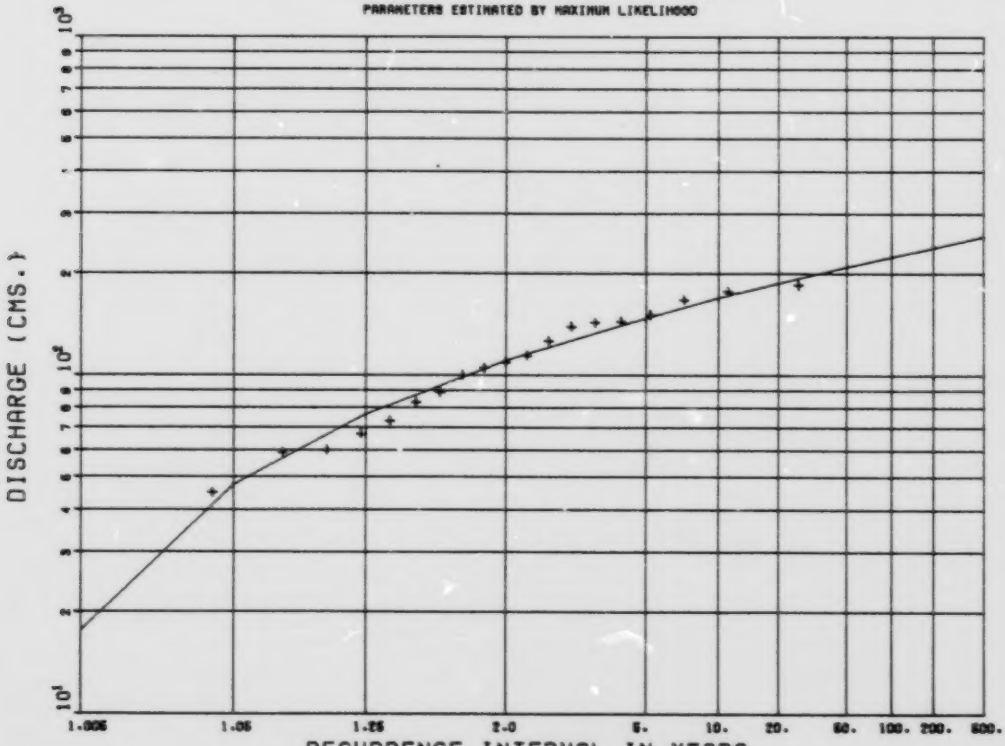
SAMPLE STATISTICS
MEAN = 116. S.D. = 42.2 C.S. = .1271 C.K. = 2.5025
SAMPLE STATISTICS (LOGS)
MEAN = 4.6475 S.D. = .4108 C.S. = -.4578 C.K. = 2.8329
SAMPLE MIN = 45. SAMPLE MAX = 185. N = 19

PARAMETERS FOR GUMBEL I A = .027516 U = 92.
PARAMETERS FOR LOGNORMAL M = 4.6475 S = .4108
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -217. N = 5.7893 S = .1288
STATISTICS OF LOG(X-A)
MEAN = 5.7893 S.D. = .1288 C.S. = -.0513 C.K. = 2.4816
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0940 B = .1909E+02 LOG(P) = 6.4423
ME= .6279E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3529 B = .1741E+01
LOG(M)F= 5.2618 M = .1928E+03
DISTRIBUTION STATISTICS MEAN = 4.6475 S.D. = .4656 C.S. =-1.5159

	CUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	32.		36.		14.		17.		30.	
1.050	52.		53.		47.		42.		51.	
1.250	75.		74.		76.		76.		75.	
2.000	106.		104.		110.		116.		108.	
2.330	113.	9.34	112.	9.50	117.	9.07	125.	0.00	116.	10.10
5.000	147.	10.20	147.	11.00	147.	8.53	153.	0.00	148.	9.63
10.000	174.	11.10	177.	12.70	169.	9.33	157.	0.00	172.	10.40
20.000	200.	11.80	205.	14.50	187.	10.80	177.	0.00	194.	12.50
50.000	234.	12.50	243.	16.60	209.	13.10	164.	0.00	219.	16.50
100.000	259.	13.00	271.	18.10	224.	14.90	168.	0.00	236.	20.10
200.000	285.	13.40	301.	19.60	234.	16.80	190.	0.00	253.	23.90
500.000	318.	13.80	341.	21.40	257.	19.30	192.	0.00	273.	29.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MAGPIE RIVER AT STEEP HILL FALLS 02BD001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I185.0

MAGPIE RIVER NEAR MICHIPICOTEN 02BD003

DRAINAGE AREA = 1930.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 197. S.D. = 71.6 C.S. = 1.6139 C.K. = 5.9912
SAMPLE STATISTICS (LOGS)
MEAN = 5.1771 S.D. = .3305 C.S. = .9984 C.K. = 4.1016
SAMPLE MIN = 118. SAMPLE MAX = 381. N = 17

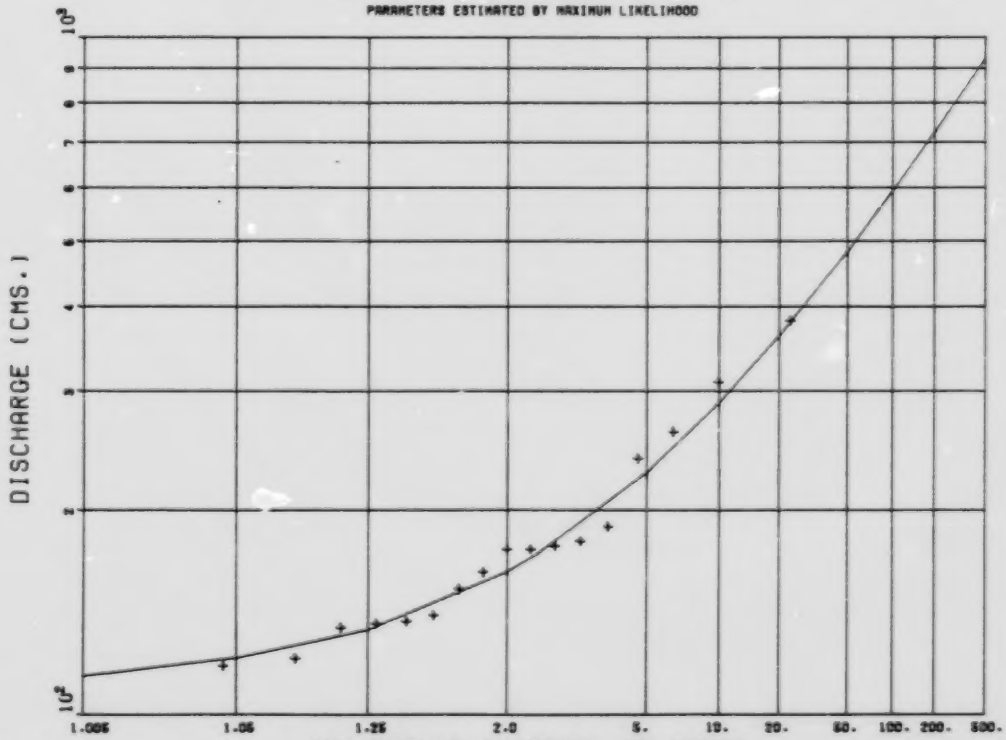
PARAMETERS FOR GUMBEL I A = .022998 U = 159.
PARAMETERS FOR LOGNORMAL M = 5.1771 S = .3305
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 110. M = 3.9685 S = .9534
STATISTICS OF LOG(X-A)
MEAN = 3.9605 S.D. = .9534 C.S. = -.2166 C.K. = 3.4268
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1650 B = .4013E+01 LOG(M) = 4.5151
ME= .9138E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	86.		76.		114.		0.		102.	
1.050	110.		103.		121.		0.		115.	
1.250	138.		134.		133.		0.		134.	
2.000	174.		177.		162.		0.		168.	
2.330	184.	7.28	188.	8.88	172.	8.61	0.	0.00	178.	9.74
5.000	224.	8.49	234.	9.33	227.	13.90	0.	0.00	227.	11.80
10.000	256.	9.51	271.	10.60	268.	19.80	0.	0.00	275.	15.80
20.000	288.	10.40	305.	12.30	362.	26.00	0.	0.00	329.	22.00
50.000	328.	11.30	349.	14.10	482.	34.30	0.	0.00	410.	32.50
100.000	359.	11.90	382.	15.45	592.	40.20	0.	0.00	482.	41.43
200.000	389.	12.40	415.	16.70	722.	46.20	0.	0.00	564.	51.2
500.000	429.	13.00	459.	18.20	927.	53.20	0.	0.00	692.	64.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MAGPIE RIVER NEAR MICHIPICOTEN 02BD003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I186.0

MAITLAND RIVER ABOVE WINGHAM 02FE005

DRAINAGE AREA : 528.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1953 - 1982

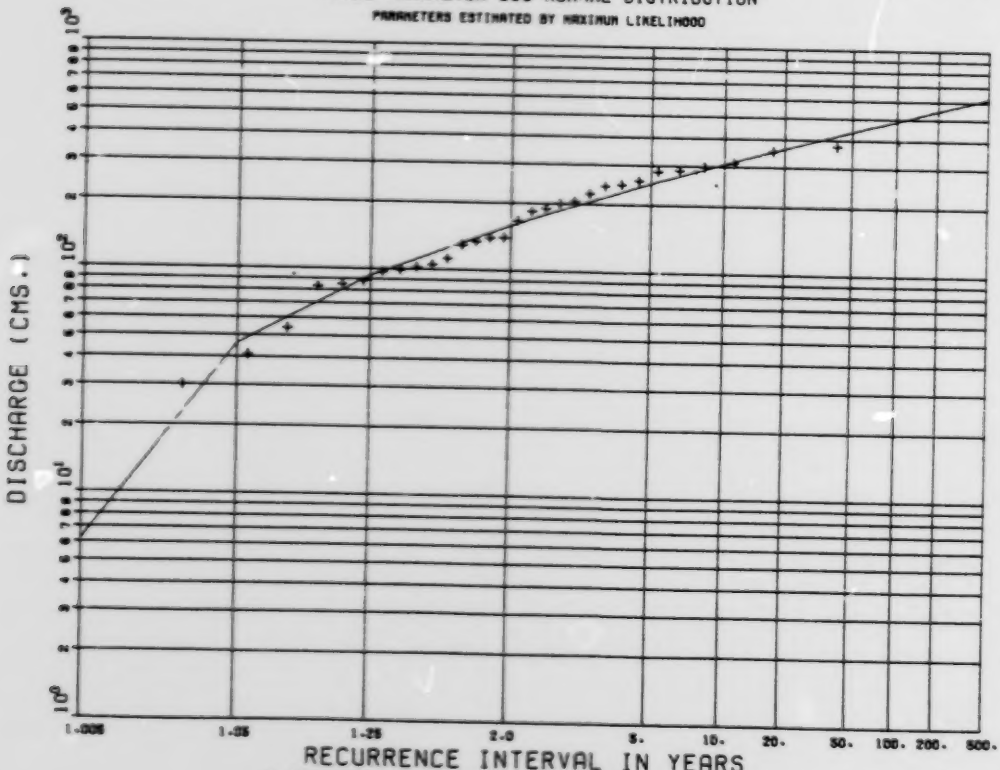
SAMPLE STATISTICS
MEAN = 175. S.D. = 94.4 C.S. = .4481 C.K. = 2.5810
SAMPLE STATISTICS (LOGS)
MEAN = 4.9967 S.D. = .6328 C.S. = -.6748 C.K. = 3.4600
SAMPLE MIN = 30. SAMPLE MAX = 374. N = 30

PARAMETERS FOR GUMBEL I A = .013051 U = 131.
PARAMETERS FOR LOGNORMAL M = 4.9967 S = .6328
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -95. M = 5.5398 S = .3567
STATISTICS OF LOG(X-A)
MEAN = 5.5398 S.D. = .3567 C.S. = -.1106 C.K. = 2.4944
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2135 B = .8784E+01 LOG(M) = 6.8722
ME= .9651E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.4256 B = .2481E+01
LOG(M)= 6.0525 M = .4252E+03
DISTRIBUTION STATISTICS MEAN = 4.9967 S.D. = .6703 C.S. =-1.2698

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	3.		29.		6.		12.		19.	
1.050	46.		52.		46.		41.		47.	
1.250	94.		87.		93.		91.		90.	
2.000	159.		148.		159.		169.		159.	
2.330	175.	10.10	166.	11.60	176.	10.70	188.	0.00	177.	12.50
5.000	246.	10.30	252.	13.40	248.	10.50	259.	0.00	254.	11.00
10.000	303.	10.70	333.	15.60	307.	11.00	303.	0.00	314.	11.50
20.000	358.	11.00	419.	17.70	362.	13.80	336.	0.00	366.	14.30
50.000	430.	11.40	543.	20.40	434.	16.70	366.	0.00	429.	19.00
100.000	483.	11.70	645.	22.20	488.	18.90	383.	0.00	471.	24.50
200.000	537.	11.90	766.	24.00	543.	21.20	395.	0.00	511.	29.40
500.000	607.	12.10	915.	26.20	616.	24.10	407.	0.00	558.	36.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MAITLAND RIVER ABOVE WINGHAM 02FE005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I187.0
I-198

MAITLAND RIVER BELOW WINGHAM 02FE002

DRAINAGE AREA : 1630.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1953 - 1982

SAMPLE STATISTICS
MEAN = 416. S.D. = 180.4 C.S. = .2786 C.K. = 2.4045
SAMPLE STATISTICS (LOGS)
MEAN = 5.9288 S.D. = .4782 C.S. = -.4281 C.K. = 2.6155
SAMPLE MIN = 142. SAMPLE MAX = 776. N = 30

PARAMETERS FOR GUMBEL I A = .006589 U = 330.
PARAMETERS FOR LOGNORMAL M = 5.9288 S = .4782
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -289. M = 6.5267 S = .2597
STATISTICS OF LOG(X-A)
MEAN = 6.5267 S.D. = .2597 C.S. = -.0958 C.K. = 2.3111
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1024 B = .2182E+02 LOG(M) = 8.1624
ME= .3507E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3016 B = .2843E+01
LOG(M)F= 6.7861 M = .8855E+03
DISTRIBUTION STATISTICS MEAN = 5.9288 S.D. = .5085 C.S. =-1.1862

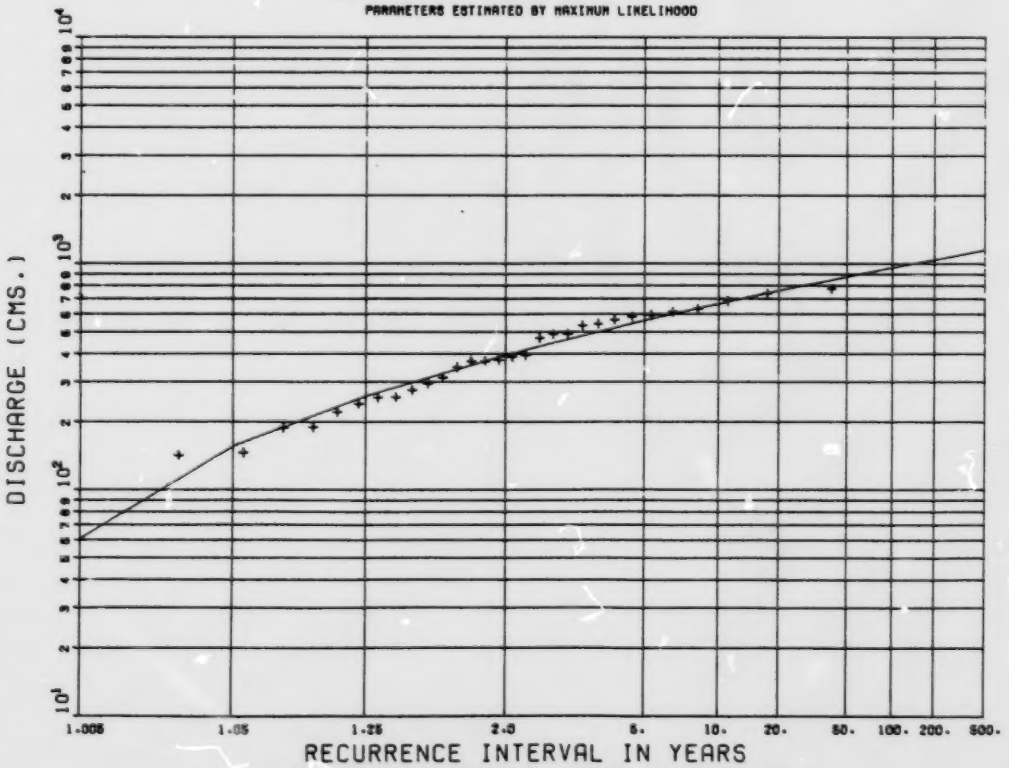
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	77.		110.		61.		58.		90.	
1.050	161.		171.		156.		143.		162.	
1.250	258.		251.		260.		259.		255.	
2.000	386.		376.		394.		414.		389.	
5.000	418.	8.41	409.	8.80	426.	8.53	449.	8.21	422.	9.38
10.000	558.	8.95	562.	10.20	561.	8.37	576.	6.87	565.	9.01
20.000	672.	9.54	694.	11.80	664.	9.43	654.	6.18	675.	9.79
50.000	781.	10.00	825.	13.40	758.	11.00	710.	5.69	775.	11.70
100.000	922.	10.60	1000.	15.40	875.	13.50	765.	5.37	897.	15.50
200.000	1030.	10.90	1140.	16.80	961.	15.40	795.	5.40	983.	18.70
500.000	1130.	11.20	1290.	18.10	1040.	17.30	818.	5.62	1060.	22.30
	1270.	11.50	1490.	19.80	1150.	19.20	841.	6.13	1170.	27.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MAITLAND RIVER BELOW WINGHAM 02FE002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I188.0.

MAITLAND RIVER NEAR DONNYBROOK 02FE004

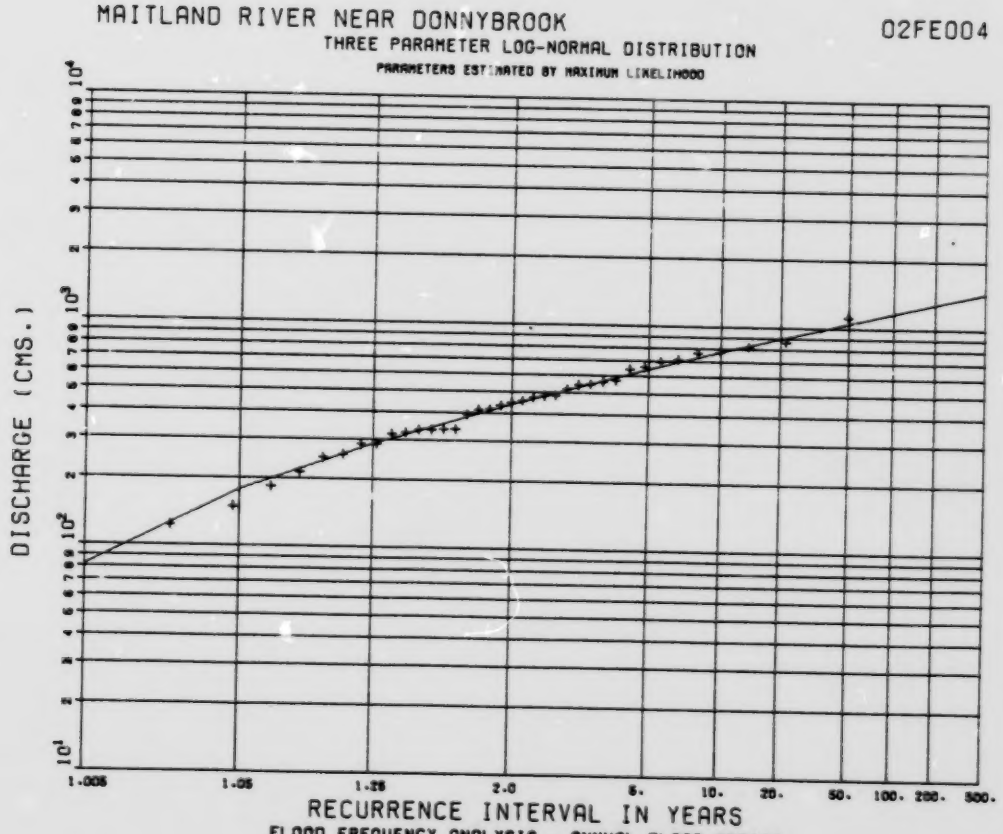
DRAINAGE AREA : 1760.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1946 - 1982

SAMPLE STATISTICS
MEAN = 473. S.D. = 220.2 C.S. = .7934 C.K. = 3.9436
SAMPLE STATISTICS (LOGS)
MEAN = 6.0474 S.D. = .4966 C.S. = -.4580 C.K. = 3.3802
SAMPLE MIN = 123. SAMPLE MAX = 1119. N = 37

PARAMETERS FOR GUMBEL I A = .005704 U = 372.
PARAMETERS FOR LOGNORMAL M = 6.0474 S = .4966
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -179. M = 6.4249 S = .3356
STATISTICS OF LOG(X-A)
MEAN = 6.4249 S.D. = .3356 C.S. = -.0483 C.K. = 2.9868
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1137 B = .1307E+02 LOG(M) = 8.2168
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3700E+04
A = -.1301 B = .1429E+02
LOG(M)F= 7.9056 M = .2712E+04
DISTRIBUTION STATISTICS MEAN = 6.0474 S.D. = .4916 C.S. = -.5292

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	80.		116.		81.		93.		95.	
1.050	177.		187.		177.		176.		176.	
1.250	289.		278.		287.		285.		283.	
2.000	436.		423.		438.		442.		439.	
2.330	474.	7.72	462.	8.23	476.	8.10	481.	8.32	479.	8.77
5.000	635.	8.18	643.	9.50	660.	8.22	664.	8.04	667.	8.35
10.000	767.	8.69	800.	11.00	779.	9.43	767.	8.45	776.	9.02
20.000	893.	9.13	957.	12.50	893.	11.10	876.	9.56	893.	10.00
50.000	1060.	9.60	1170.	14.40	1050.	13.20	1010.	11.70	1040.	14.30
100.000	1180.	9.88	1340.	15.70	1170.	15.60	1100.	13.60	1140.	17.40
200.000	1300.	10.10	1520.	17.00	1290.	17.90	1190.	15.80	1230.	20.70
500.000	1460.	10.40	1770.	18.50	1440.	20.10	1280.	18.90	1350.	25.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I189.0

MARTEN RIVER AT WICKSTEED LAKE DAM 02DC009

DRAINAGE AREA : 294.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1949 - 1976

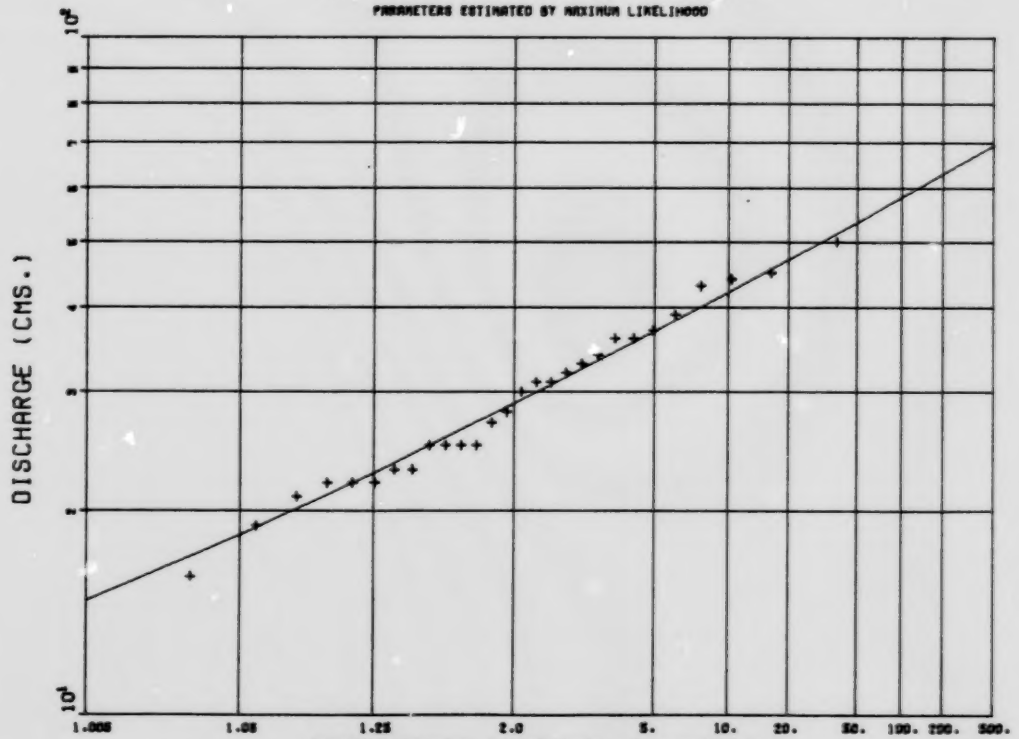
SAMPLE STATISTICS
MEAN = 30. S.D. = 8.7 C.S. = .5836 C.K. = 2.9916
SAMPLE STATISTICS (LOGS)
MEAN = 3.3669 S.D. = .2847 C.S. = .0519 C.K. = 2.7421
SAMPLE MIN = 16. SAMPLE MAX = 53. N = 28

PARAMETERS FOR GUMBEL I A = .144369 U = 26.
PARAMETERS FOR LOGNORMAL M = 3.3669 S = .2847
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 3.1776 S = .3435
STATISTICS OF LOG(X-A)
MEAN = 3.1776 S.D. = .3435 C.S. = -.0720 C.K. = 2.8427
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0074 B = .1487E+04 LOG(M) =-7.6135
ME= .4937E-03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0144 B = .3777E+03
LOG(M)= -2.1693 M = .1263E+00
DISTRIBUTION STATISTICS MEAN = 3.3669 S.D. = .2797 C.S. = .1029

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	15.		14.		15.		15.		14.	
1.050	18.		18.		18.		19.		18.	
1.250	23.		23.		23.		23.		23.	
2.100	29.		29.		29.		29.		29.	
2.330	30.	5.51	31.	5.42	30.	5.84	30.	5.74	30.	5.84
5.000	37.	6.46	37.	6.26	37.	6.58	37.	6.35	37.	6.38
10.000	42.	7.25	42.	7.26	42.	7.58	42.	7.60	42.	7.57
20.000	47.	7.92	46.	8.25	47.	9.78	46.	9.41	47.	9.33
50.000	53.	8.66	52.	9.49	53.	12.50	52.	12.40	52.	12.20
100.000	58.	9.12	56.	10.40	58.	14.50	57.	14.80	57.	14.70
200.000	63.	9.52	60.	11.20	63.	16.70	61.	17.50	61.	17.30
500.000	69.	9.97	66.	12.20	69.	19.50	67.	21.10	67.	20.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MARTEN RIVER AT WICKSTEED LAKE DAM 02DC009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I190.0
I-201

MATABITCHUAN RIVER AT RABBIT LAKE DAM 02JE021

DRAINAGE AREA : 749.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1947 - 1981

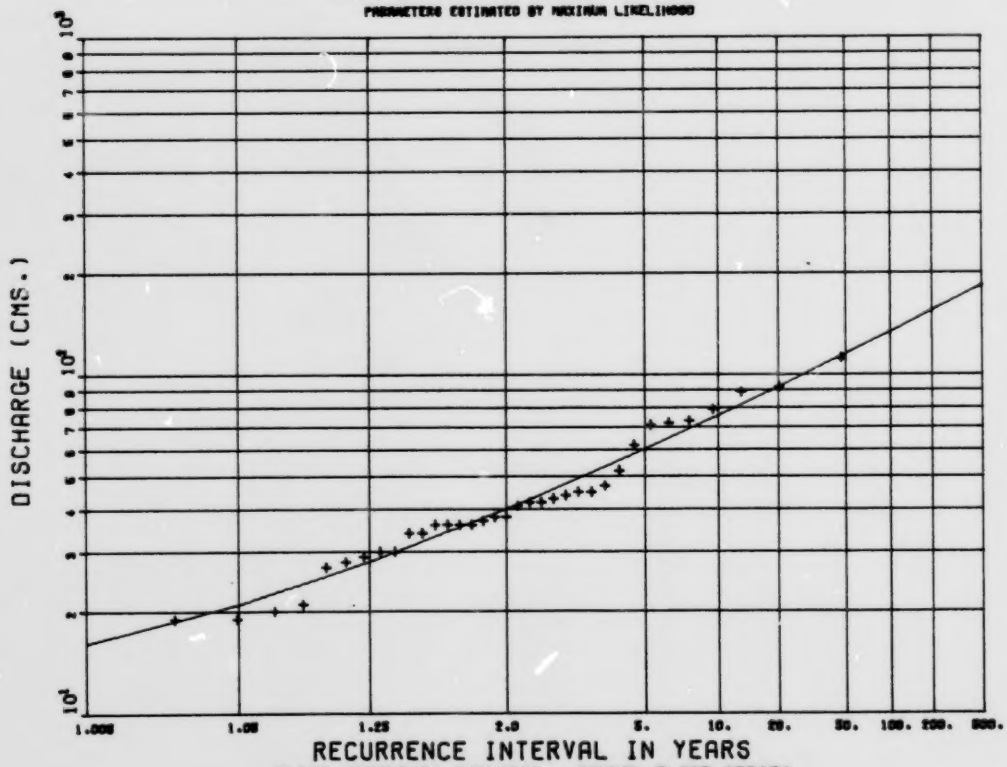
SAMPLE STATISTICS
MEAN = 46. S.D. = 22.3 C.S. = 1.3055 C.K. = 4.5977
SAMPLE STATISTICS (LOGS)
MEAN = 3.7201 S.D. = .4491 C.S. = .3261 C.K. = 3.0642
SAMPLE MIN = 19. SAMPLE MAX = 112. N = 35

PARAMETERS FOR GUMBEL I A = .066125 U = 36.
PARAMETERS FOR LOGNORMAL M = 3.7201 S = .4491
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 10. M = 3.4039 S = .6073
STATISTICS OF LOG(X-A)
MEAN = 3.4039 S.D. = .6073 C.S. = -.0675 C.K. = 3.1414
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0732 B = .3762E+02 LOG(M) = .9658
ME= .2627E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0960 B = .2145E+02
LOG(M)= 1.6618 M = .5269E+01
DISTRIBUTION STATISTICS MEAN = 3.7201 S.D. = .4444 C.S. = .4318

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	11.		13.		16.		16.		15.	
1.050	19.		20.		21.		21.		21.	
1.250	29.		28.		28.		28.		28.	
2.000	42.		41.		40.		40.		40.	
2.330	45.	7.22	45.	7.65	43.	8.34	43.	8.15	44.	8.39
5.000	59.	7.82	60.	8.83	60.	9.99	59.	9.74	60.	9.63
10.000	70.	8.42	73.	10.20	75.	12.40	74.	12.30	74.	12.00
20.000	81.	8.91	86.	11.60	92.	15.20	90.	15.60	90.	15.30
50.000	95.	9.44	104.	13.40	115.	19.00	114.	20.70	112.	20.60
100.000	106.	9.77	117.	14.60	133.	21.80	133.	24.90	131.	25.00
200.000	116.	10.00	131.	15.80	154.	24.60	155.	29.30	151.	29.70
500.000	130.	10.40	150.	17.20	183.	28.20	188.	35.40	180.	36.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MATABITCHUAN RIVER AT RABBIT LAKE DAM 02JE021
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I191.0

MATTAGAMI RIVER AT LITTLE LONG RAPIDS 04LG003

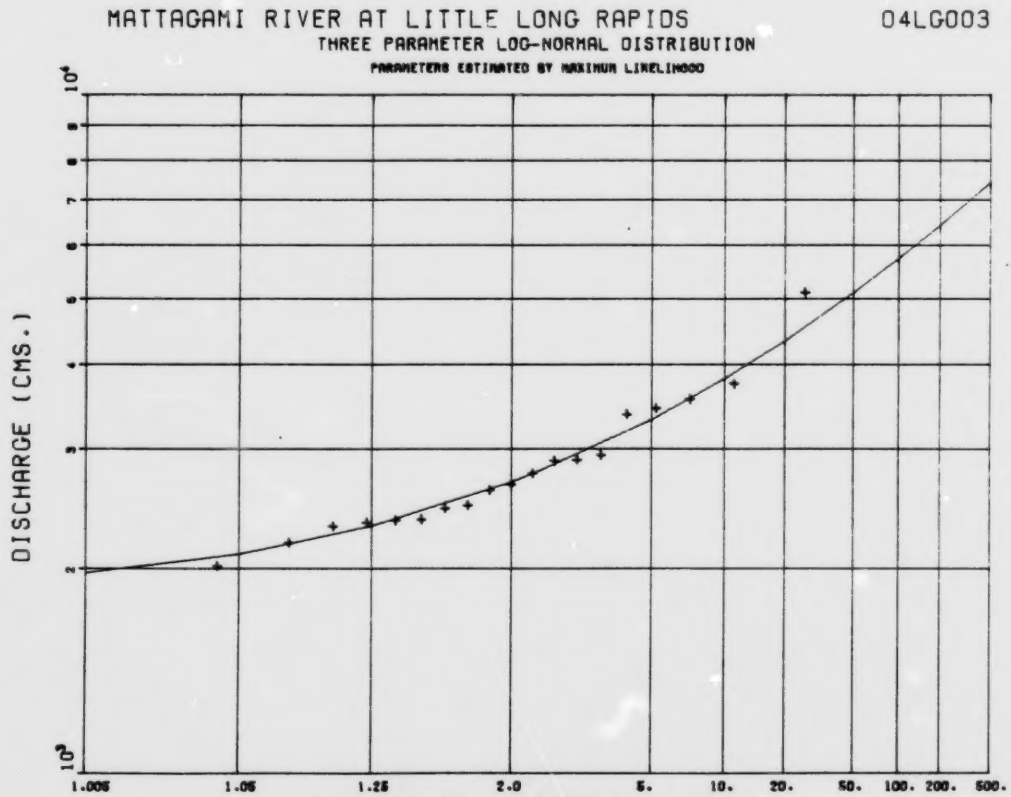
DRAINAGE AREA : 34700.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1964 - 1982

SAMPLE STATISTICS
MEAN = 2967. S.D. = 729.6 C.S. = 1.7436 C.K. = 7.4808
SAMPLE STATISTICS (LOGS)
MEAN = 7.9350 S.D. = .2261 C.S. = 1.0705 C.K. = 4.3254
SAMPLE MIN = 2017. SAMPLE MAX = 5104. N = 19

PARAMETERS FOR GUMBEL I A = .002146 U = 2570.
PARAMETERS FOR LOGNORMAL M = 7.9350 S = .2261
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1797. M = 6.7815 S = .6428
STATISTICS OF LOG(X-A)
MEAN = 6.7815 S.D. = .6428 C.S. = -.0261 C.K. = 3.8049
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1210 B = .3490E+01 LOG(M) = 7.5125
ME= .1831E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1281 B = .3016E+01
LOG(M)= 7.5486 M = .1898E+04
DISTRIBUTION STATISTICS MEAN = 7.9350 S.D. = .2225 C.S. = 1.1517

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1790.		1560.		1973.		1980.		1940.	
1.050	2050.		1930.		2100.		2110.		2080.	
1.250	2350.		2310.		2317.		2320.		2310.	
2.000	2740.		2790.		2682.		2640.		2690.	
2.330	2940.	4.78	2910.	5.23	2790.	5.48	2780.	5.20	2800.	6.40
5.000	3270.	5.89	3380.	6.04	3310.	7.85	3290.	7.53	3310.	7.75
10.000	3620.	6.83	3730.	7.00	3810.	10.20	3760.	10.20	3780.	10.40
20.000	3950.	7.65	4050.	7.96	4330.	14.30	4260.	13.20	4283.	14.70
50.000	4390.	8.57	4440.	9.15	5100.	19.20	4990.	17.50	5003.	21.60
100.000	4710.	9.17	4730.	9.99	5731.	23.00	5600.	20.90	5600.	28.00
200.000	5040.	9.70	5000.	10.80	6410.	26.50	6280.	24.50	6260.	34.70
500.000	5470.	10.30	5360.	11.80	7410.	32.10	7290.	29.40	7240.	44.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1192.0

MATTAGAMI R. AT SMOKY FALLS/LITTLE LONG RAPIDS 04LG001

DRAINAGE AREA = 34700.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1927 - 1982

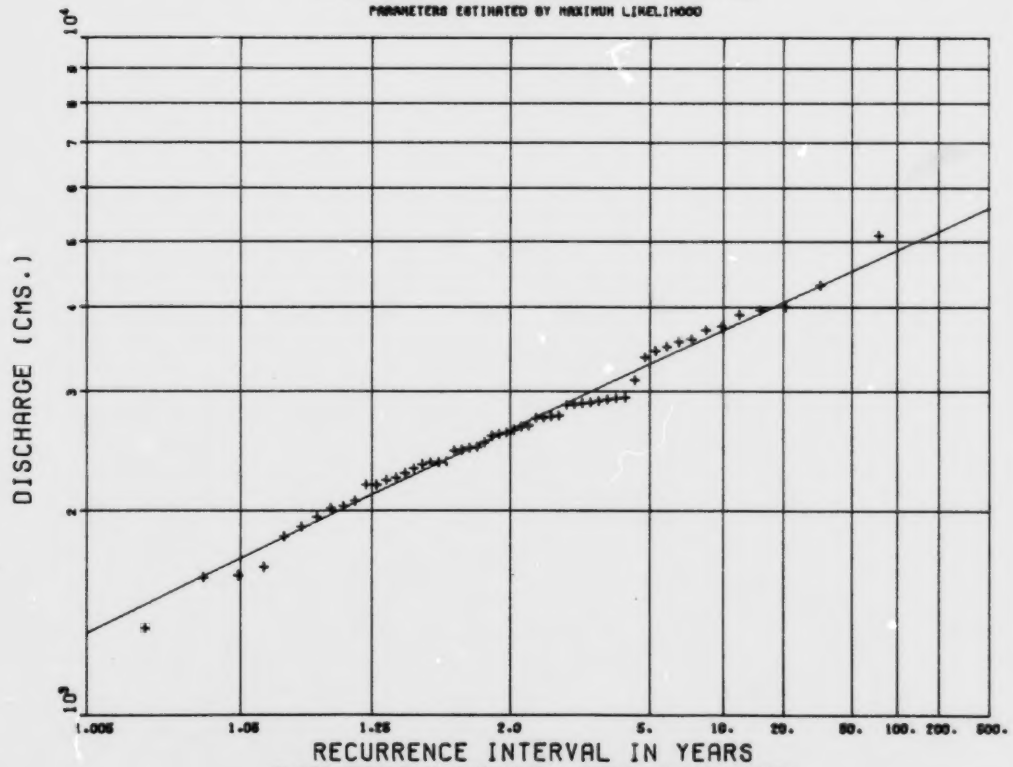
SAMPLE STATISTICS
MEAN = 2723. S.D. = 732.7 C.S. = .8262 C.K. = 4.2331
SAMPLE STATISTICS (LOGS)
MEAN = 7.8751 S.D. = .2646 C.S. = -.0167 C.K. = 3.4186
SAMPLE MIN = 1344. SAMPLE MAX = 5108. N = 56

PARAMETERS FOR GUMBEL I A = .001657 U = 2387.
PARAMETERS FOR LOGNORMAL M = 7.8751 S = .2646
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -82. M = 7.9068 S = .2564
STATISTICS OF LOG(X-A)
MEAN = 7.9068 S.D. = .2564 C.S. = .0101 C.K. = 3.4080
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0022 B = .1435E+05 LOG(M) = 39.5813
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1549E+18
A = -.0020 B = .1797E+05
LOG(M)F=43.0271 M = .4858E+19
DISTRIBUTION STATISTICS MEAN = 7.8751 S.D. = .2623 C.S. = -.0149

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1300.		1330.		1320.		1330.		1330.	
1.050	1710.		1700.		1700.		1710.		1700.	
1.250	2100.		2110.		2110.		2110.		2110.	
2.000	2610.		2630.		2630.		2630.		2630.	
2.330	2740.	3.74	2760.	3.56	2760.	3.78	2760.	3.79	2760.	3.83
5.000	3290.	4.41	3290.	4.12	3290.	4.09	3280.	4.08	3290.	4.12
10.000	3740.	4.98	3690.	4.77	3690.	4.85	3600.	4.79	3690.	4.83
20.000	4180.	5.46	4070.	5.42	4060.	5.88	4050.	5.85	4060.	5.90
50.000	4740.	5.98	4530.	6.24	4520.	7.44	4500.	7.64	4520.	7.70
100.000	5160.	6.31	4870.	6.81	4850.	8.55	4830.	9.15	4850.	9.22
200.000	5580.	6.60	5200.	7.35	5170.	9.95	5150.	10.80	5180.	10.80
500.000	6140.	6.93	5640.	8.02	5600.	11.60	5570.	13.00	5610.	13.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MATTAGAMI R. AT SMOKY FALLS/LITTLE LONG RAPIDS 04LG001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I193.0

MATTAGAMI RIVER AT SMOKY FALLS 04LG001

DRAINAGE AREA : 34700.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1927 - 1963

SAMPLE STATISTICS
MEAN = 2649. S.D. = 733.1 C.S. = .4799 C.K. = 3.0262
SAMPLE STATISTICS (LOGS)
MEAN = 7.8444 S.D. = .2803 C.S. = -.1643 C.K. = 2.9878
SAMPLE MIN = 1344. SAMPLE MAX = 4309. N = 37

PARAMETERS FOR GUMBEL I A = .021613 U = 2334.
PARAMETERS FOR LOGNORMAL M = 7.8444 S = .2803
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -975. M = 8.0536 S = .2270
STATISTICS OF LOG(X-A)
MEAN = 8.0536 S.D. = .2270 C.S. = -.0760 C.K. = 2.9110
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0230 B = .1481E+03 LOG(M) =11.2557
ME= .7712E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0333 B = .6930E+02
LOG(M)= 10.1498 M = .2559E+05
DISTRIBUTION STATISTICS MEAN = 7.8444 S.D. = .2770 C.S. = -.2403

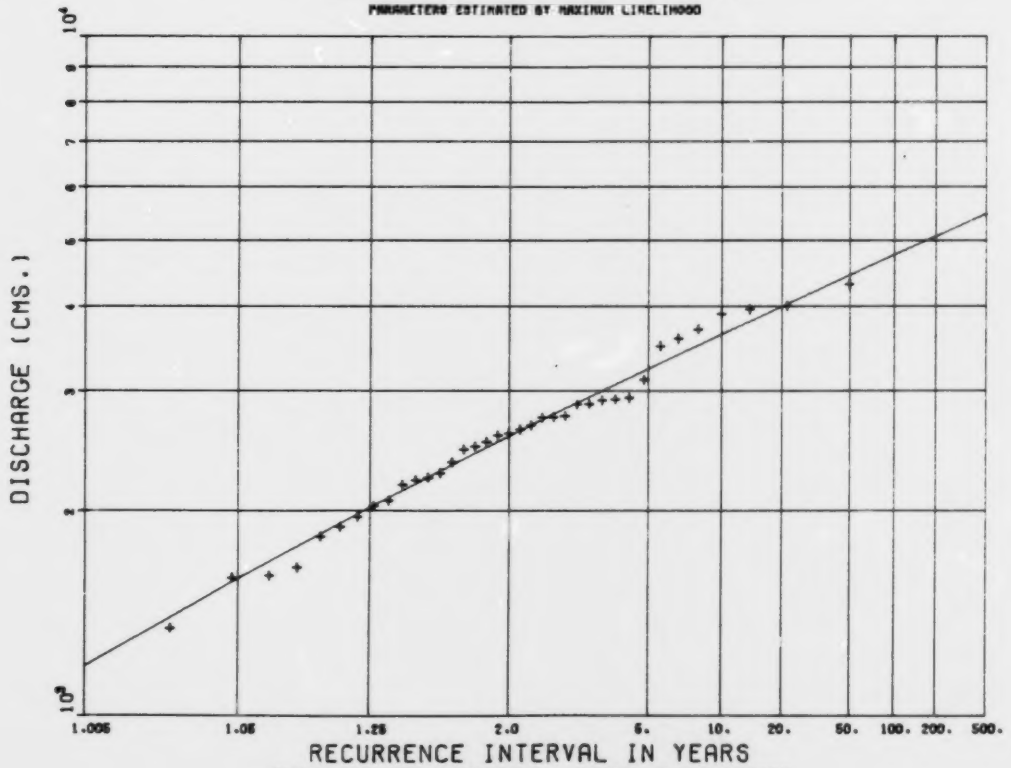
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1270.		1240.		1180.		1170.		1190.	
1.050	1610.		1610.		1590.		1590.		1590.	
1.250	2010.		2010.		2020.		2030.		2020.	
2.000	2530.		2550.		2570.		2580.		2570.	
2.330	2660.	4.85	2680.	4.64	2730.	4.86	2710.	4.85	2700.	4.96
5.000	3230.	5.64	3230.	5.36	3230.	5.12	3230.	4.98	3240.	5.15
10.000	3700.	6.37	3650.	6.22	3630.	5.98	3610.	5.58	3630.	5.97
20.000	4150.	6.95	4050.	7.07	3990.	7.19	3950.	6.62	3990.	7.08
50.000	4720.	7.59	4540.	8.13	4440.	9.03	4350.	8.47	4430.	9.19
100.000	5160.	7.99	4900.	8.87	4760.	10.50	4630.	10.13	4730.	11.00
200.000	5590.	8.33	5250.	9.58	5070.	12.00	4890.	11.80	5030.	13.00
500.000	6160.	8.72	5720.	10.50	5470.	14.00	5230.	14.20	5410.	15.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MATTAGAMI RIVER AT SMOKY FALLS 04LG001

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I193.1

MATTAGAMI RIVER AT SMOOTH ROCK FALLS 04LB001

DRAINAGE AREA : 10000.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1920 - 1976

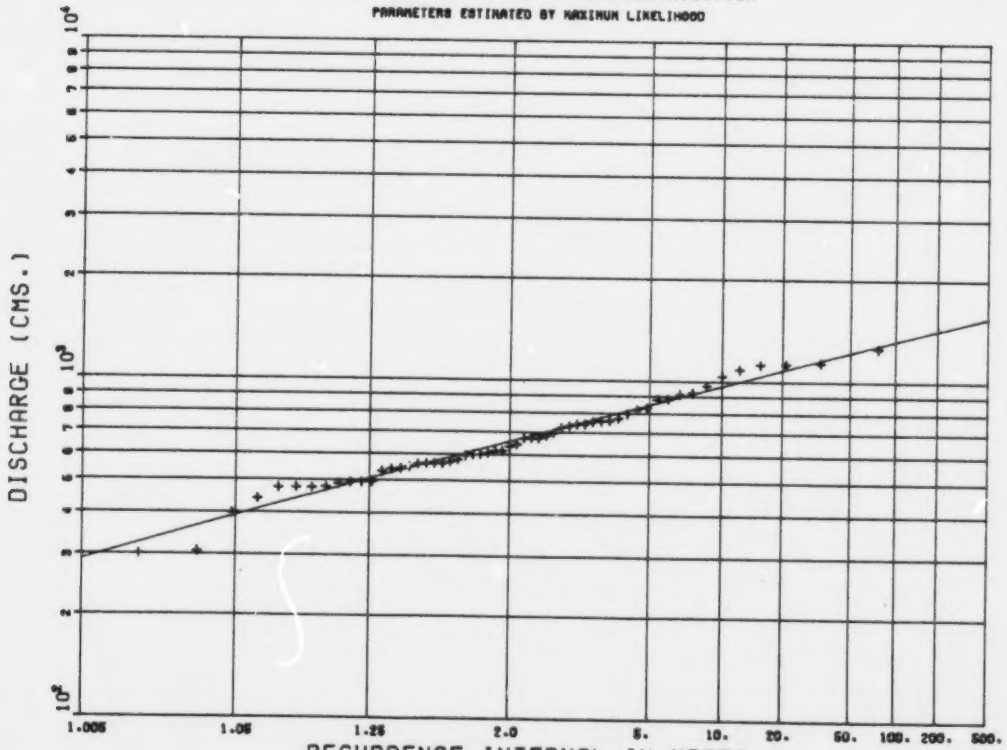
SAMPLE STATISTICS
MEAN = 684. S.D. = 212.2 C.S. = .7757 C.K. = 3.4449
SAMPLE STATISTICS (LOGS)
MEAN = 6.4816 S.D. = .3067 C.S. = -.0566 C.K. = 3.3458
SAMPLE MIN = 301. SAMPLE MAX = 1256. N = 57

PARAMETERS FOR GUMBEL I A = .005843 U = 587.
PARAMETERS FOR LOGNORMAL M = 6.4816 S = .3067
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -42. M = 6.5469 S = .2872
STATISTICS OF LOG(X-A)
MEAN = 6.5469 S.D. = .2872 C.S. = .0765 C.K. = 3.2752
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0087 B = .1247E+04 LOG(M) =17.3111
ME= .3297E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0083 B = .1352E+04
LOG(M)F=17.5586 M = .4667E+08
DISTRIBUTION STATISTICS MEAN = 6.4816 S.D. = .3040 C.S. = -.0544

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	301.		296.		290.		294.		292.	
1.050	396.		394.		392.		394.		392.	
1.250	505.		504.		505.		506.		505.	
2.000	649.		651.		655.		655.		655.	
2.333	686.	4.19	690.	4.09	691.	4.32	691.	4.35	692.	4.39
5.000	843.	4.84	845.	4.73	846.	4.65	844.	4.64	846.	4.68
10.000	972.	5.39	968.	5.48	965.	5.50	962.	5.40	966.	5.44
20.000	1090.	5.86	1080.	6.23	1080.	6.65	1070.	6.58	1080.	6.63
50.000	1250.	6.36	1230.	7.16	1220.	8.36	1210.	8.55	1210.	8.63
100.000	1370.	6.67	1330.	7.82	1320.	9.72	1310.	10.20	1320.	10.30
200.000	1490.	6.94	1440.	8.44	1420.	11.10	1410.	12.00	1420.	12.10
500.000	1650.	7.24	1580.	9.22	1550.	12.90	1540.	14.50	1550.	14.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MATTAGAMI RIVER AT SMOOTH ROCK FALLS 04LB001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I194.0
I-206

MATTAGAMI RIVER NEAR TIMMINS 04LA002

DRAINAGE AREA : 5540.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1969 - 1982

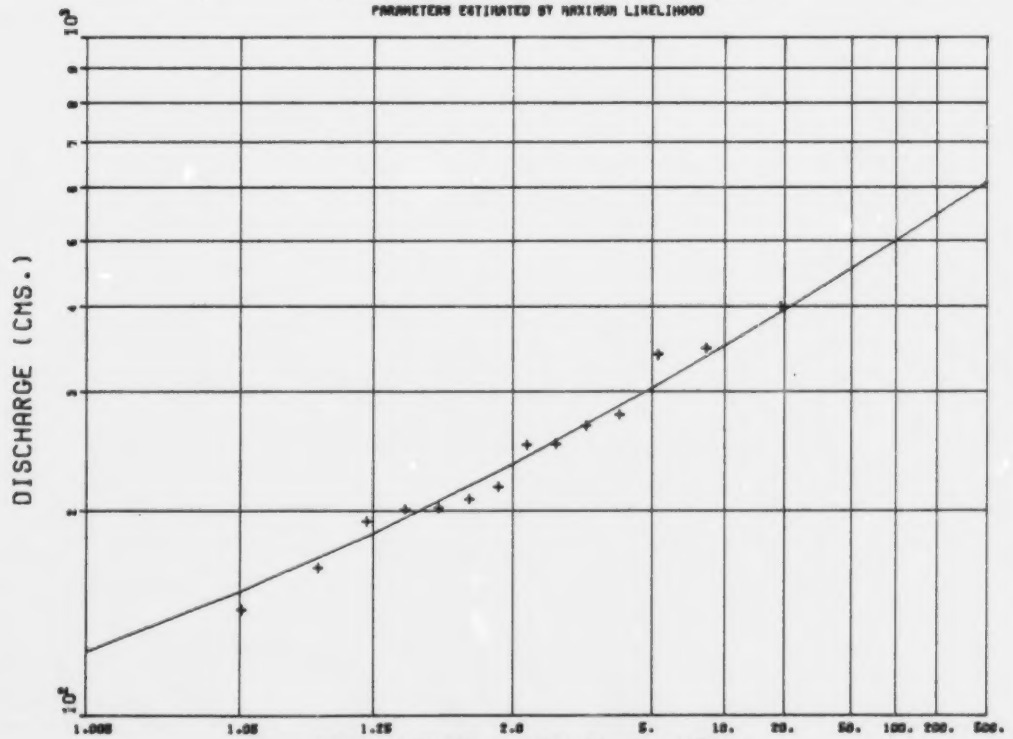
SAMPLE STATISTICS
MEAN = 247. S.D. = 73.6 C.S. = .7358 C.K. = 3.7696
SAMPLE STATISTICS (LOGS)
MEAN = 5.4706 S.D. = .2909 C.S. = .1702 C.K. = 3.4054
SAMPLE MIN = 143. SAMPLE MAX = 400. N = 14

PARAMETERS FOR GUMBEL I A = .017771 U = 214.
PARAMETERS FOR LOGNORMAL M = 5.4706 S = .2909
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 65. M = 5.1292 S = .4068
STATISTICS OF LOG(X-A)
MEAN = 5.1292 S.D. = .4068 C.S. = -.0859 C.K. = 3.5488
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0248 B = .1381E+03 LOG(M) = 2.0525
ME= .7788E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0415 B = .4591E+02
LOG(M)F= 3.5646 M = .3532E+02
DISTRIBUTION STATISTICS MEAN = 5.4706 S.D. = .2813 C.S. = .2952

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	125.		112.		124.		134.		113.	
1.050	152.		147.		162.		153.		149.	
1.250	188.		186.		185.		147.		186.	
2.000	235.		228.		234.		234.		236.	
2.333	247.	7.73	250.	7.84	247.	8.51	246.	8.18	243.	8.43
5.000	299.	9.07	304.	9.05	301.	9.94	300.	9.46	303.	9.50
10.000	341.	10.20	345.	10.50	350.	12.30	343.	11.70	347.	11.50
20.000	381.	11.20	383.	11.90	395.	15.20	386.	14.70	389.	14.40
50.000	434.	12.20	432.	13.70	455.	19.40	442.	19.40	443.	19.10
100.000	473.	12.80	467.	15.00	500.	22.80	486.	23.40	485.	23.00
200.000	512.	13.40	503.	16.20	547.	26.10	530.	27.60	527.	27.10
500.000	564.	14.10	549.	17.60	610.	30.50	592.	33.30	584.	32.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MATTAGAMI RIVER NEAR TIMMINS 04LA002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I195.0

MATTAWA RIVER BELOW BOUILLON LAKE 02JE020

DRAINAGE AREA : 919.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	99.	16.	-.270	4.416
LN X SERIES	4.58	.18	-.666	5.407

X(MIN)= 50. CMS.
X(MAX)= 112. CMS.
TOTAL SAMPLE SIZE= 11
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	92.	13.	.218	3.395
LN X SERIES	4.52	.14	.095	3.311
LN (X-A) SERIES	3.07	.58	-.310	3.599

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 67.3925 N = 3.0707 S = .5811

FLOOD FREQUENCY REGIME

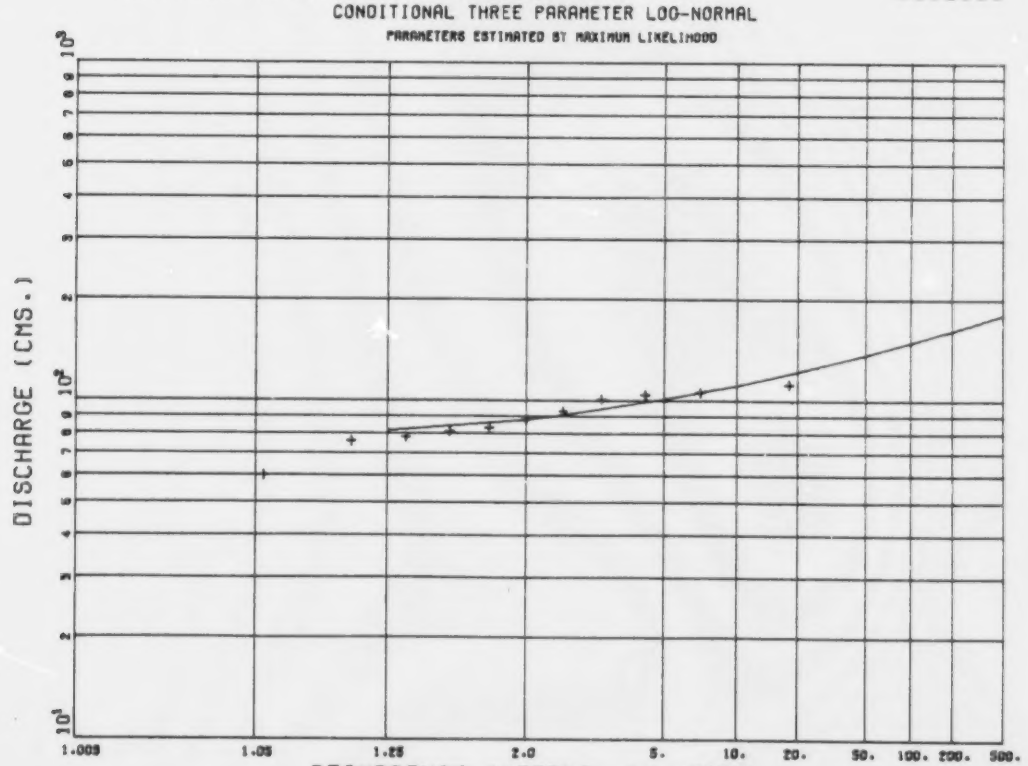
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	81.
2.000	.500	87.
3.330	.429	90.
5.000	.200	101.
10.000	.100	111.
20.000	.050	122.
50.000	.020	137.
100.000	.010	149.
200.000	.005	162.
500.000	.002	180.

MATTAWA RIVER BELOW BOUILLON LAKE 02JE020

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I196.0

MCINTYRE RIVER AT THUNDER BAY 02AB016

DRAINAGE AREA = 145.0 SQ. KM.
REGULATED FLOW = CLASS 1
PERIOD OF RECORD = 1972 - 1982

SAMPLE STATISTICS
MEAN = 29. S.D. = 18.8 C.S. = 1.4098 C.K. = 6.0020
SAMPLE STATISTICS (LOGS)
MEAN = 3.1594 S.D. = .6162 C.S. = .4262 C.K. = 3.3452
SAMPLE MIN = 11. SAMPLE MAX = 72. N = 11

PARAMETERS FOR GUMBEL I A = .093865 U = 20.
PARAMETERS FOR LOGNORMAL M = 3.1594 S = .6162
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. M = 2.1041 S = 1.5496
STATISTICS OF LOG(X-A)
MEAN = 2.1041 S.D. = 1.5496 C.S. = -.6968 C.K. = 3.4338
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1313 B = .2202E+02 LOG(P) = .2681
ME= .1307E+01

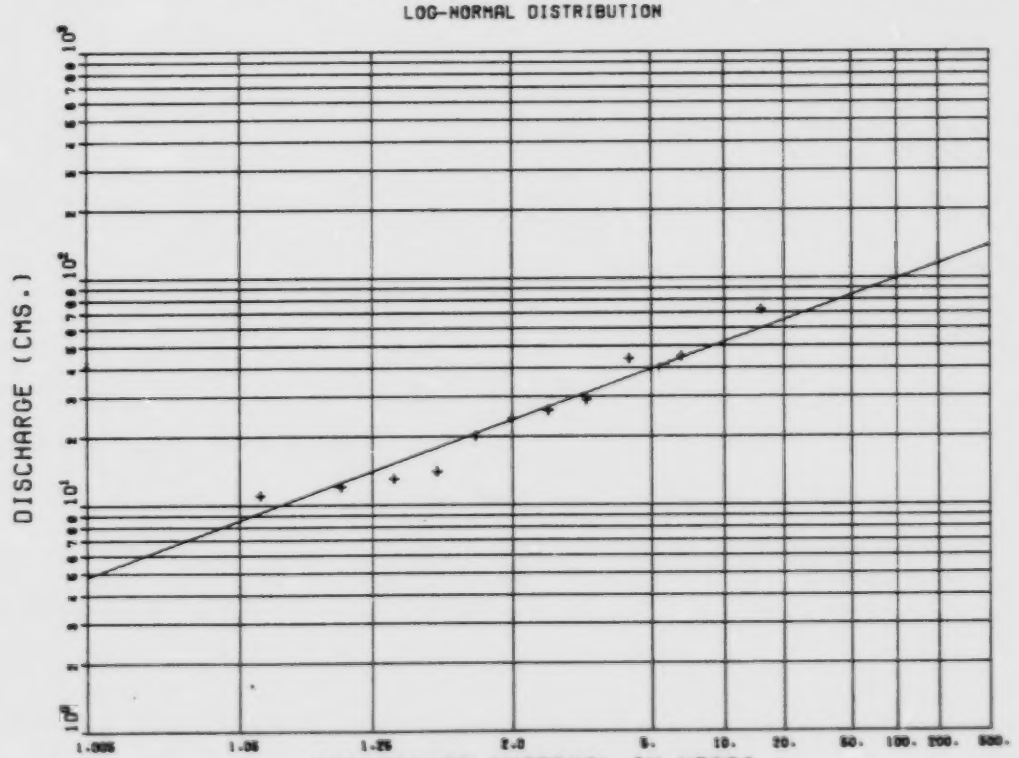
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		5.		11.		0.		6.	
1.050	7.		9.		11.		0.		9.	
1.250	15.		14.		13.		0.		14.	
2.000	25.		24.		19.		0.		23.	
2.330	27.	16.70	26.	18.70	21.	23.90	0.	0.00	25.	20.70
5.000	38.	16.90	40.	21.60	41.	45.30	0.	0.00	39.	24.10
10.000	47.	17.60	52.	25.10	70.	54.00	0.	0.00	53.	32.50
20.000	56.	18.20	65.	28.50	115.	66.20	0.	0.00	70.	39.40
50.000	67.	18.90	83.	32.80	205.	80.10	0.	0.00	96.	53.70
100.000	75.	19.30	99.	35.80	312.	89.40	0.	0.00	119.	65.70
200.000	84.	19.70	115.	38.60	455.	97.90	0.	0.00	148.	78.40
500.000	95.	20.30	139.	42.10	722.	108.00	0.	0.00	192.	95.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MCINTYRE RIVER AT THUNDER BAY 02AB016

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE = I197.0

MCKENZIE CREEK NEAR CALEDONIA 02GB010

DRAINAGE AREA : 171.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1962 - 1982

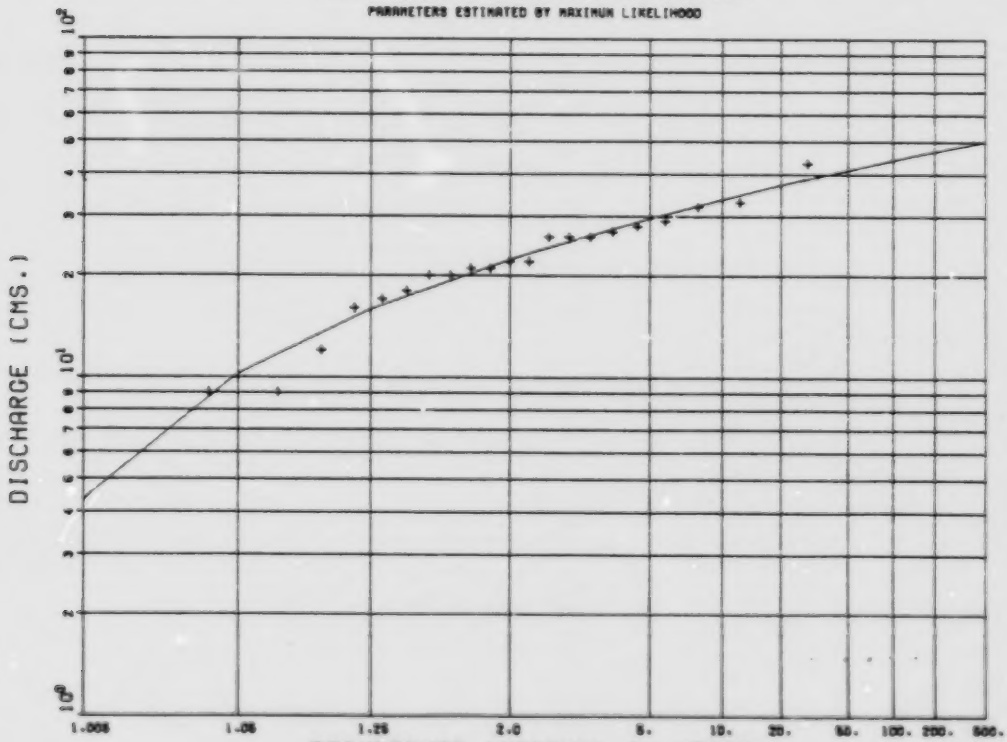
SAMPLE STATISTICS
MEAN = 23. S.D. = 8.2 C.S. = .3834 C.K. = 4.2286
SAMPLE STATISTICS (LOGS)
MEAN = 3.0539 S.D. = .3988 C.S. = -.7637 C.K. = 4.0934
SAMPLE MIN = 9. SAMPLE MAX = 43. N = 21

PARAMETERS FOR GUMBEL I A = .177651 U = 19.
PARAMETERS FOR LOGNORMAL M = 3.0539 S = .3988
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -45. M = 4.2066 S = .1204
STATISTICS OF LOG(X-A)
MEAN = 4.2066 S.D. = .1204 C.S. = -.0030 C.K. = 3.8035
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1423 B = .6858E+01 LOG(M) = 4.0983
ME= .6023E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1308 B = .6752E+01
LOG(M)F= 4.1987 M = .6660E+02
DISTRIBUTION STATISTICS MEAN = 3.0539 S.D. = .3870 C.S. = -.6761

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	7.		8.		4.		6.		6.	
1.050	11.		11.		10.		11.		10.	
1.250	15.		15.		16.		16.		16.	
2.000	22.		21.		22.		22.		22.	
2.330	23.	8.73	23.	8.77	24.	8.20	24.	8.49	24.	9.43
5.000	30.	9.61	30.	10.10	29.	7.75	30.	7.96	30.	7.98
10.000	35.	10.40	35.	11.70	34.	8.49	34.	9.08	34.	8.36
20.000	40.	11.10	41.	13.30	37.	9.81	37.	8.76	37.	10.60
50.000	47.	11.80	48.	15.30	41.	11.60	41.	10.40	41.	15.00
100.000	52.	12.30	54.	16.80	44.	13.70	43.	12.30	43.	18.80
200.000	57.	12.60	59.	18.10	47.	15.40	45.	13.80	45.	22.60
500.000	64.	13.10	67.	19.70	50.	17.70	48.	16.30	47.	27.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MCKENZIE CREEK NEAR CALEDONIA 02GB010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1198.0

MEDWAY RIVER AT LONDON 02GD008

DRAINAGE AREA : 200.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1973 - 1982

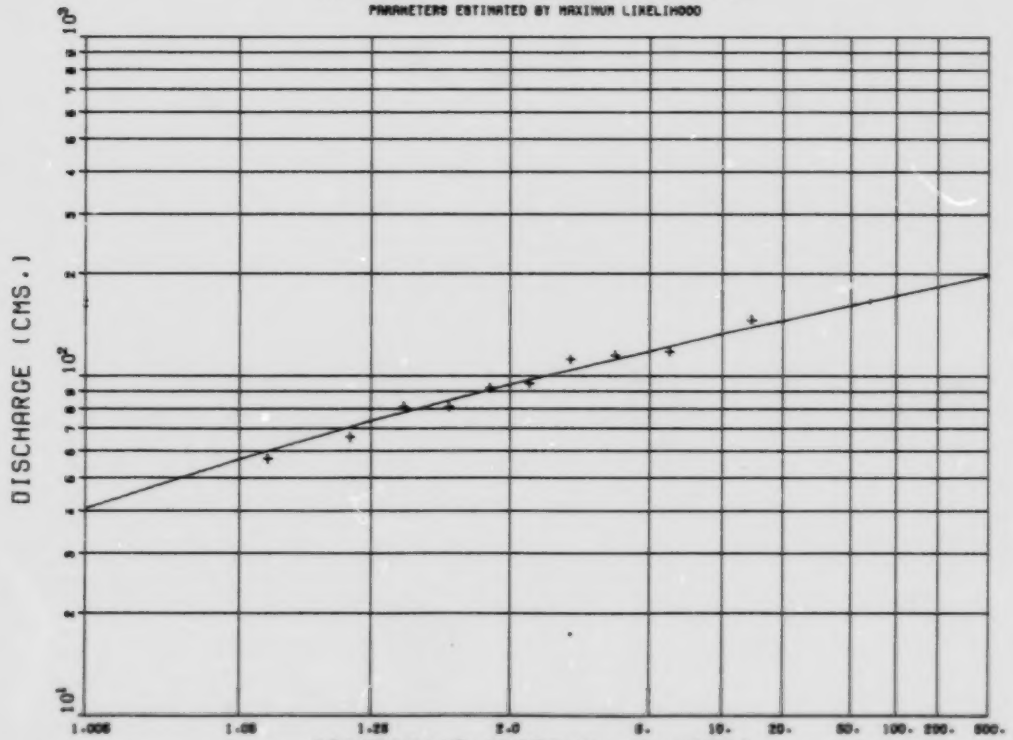
SAMPLE STATISTICS
MEAN = 96. S.D. = 26.8 C.S. = .3418 C.K. = 4.1343
SAMPLE STATISTICS (LOGS)
MEAN = 4.5315 S.D. = .2859 C.S. = -.2333 C.K. = 3.9071
SAMPLE MIN = 57. SAMPLE MAX = 146. N = 10

PARAMETERS FOR GUMBEL I A = .045026 U = 84.
PARAMETERS FOR LOGNORMAL M = 4.5315 S = .2859
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -40. M = 4.8964 S = .1980
STATISTICS OF LOG(X-A)
MEAN = 4.8964 S.D. = .1980 C.S. = -.0615 C.K. = 3.8662
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0334 B = .7348E+02 LOG(M) = 6.9824
ME= .1078E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0633 B = .1872E+02
LOG(M)= 5.7170 M = .3043E+03
DISTRIBUTION STATISTICS MEAN = 4.5315 S.D. = .2740 C.S. = -.4622

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	47.		45.		41.		41.		42.	
1.050	59.		58.		57.		57.		57.	
1.250	73.		73.		73.		74.		73.	
2.000	92.		93.		94.		95.		94.	
2.330	97.	9.21	98.	9.11	99.	9.45	100.	9.01	99.	9.72
5.000	117.	10.80	118.	10.50	118.	9.76	117.	8.82	116.	9.91
10.000	134.	12.10	134.	12.20	133.	11.20	130.	9.42	133.	11.10
20.000	150.	13.30	149.	13.90	145.	13.40	140.	10.70	146.	13.40
50.000	171.	14.50	167.	15.90	161.	16.80	152.	13.30	161.	17.40
100.000	186.	15.30	181.	17.40	172.	19.50	160.	15.70	172.	20.90
200.000	202.	15.90	194.	18.80	183.	22.20	167.	18.20	182.	24.60
500.000	222.	16.70	212.	20.50	197.	25.80	176.	21.80	195.	29.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MEDWAY RIVER AT LONDON 02GD008
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1199.0

MICHIPICOTEN RIVER AT HIGH FALLS (1934 - 1966) 02BD002

DRAINAGE AREA : 5130.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1934 - 1966

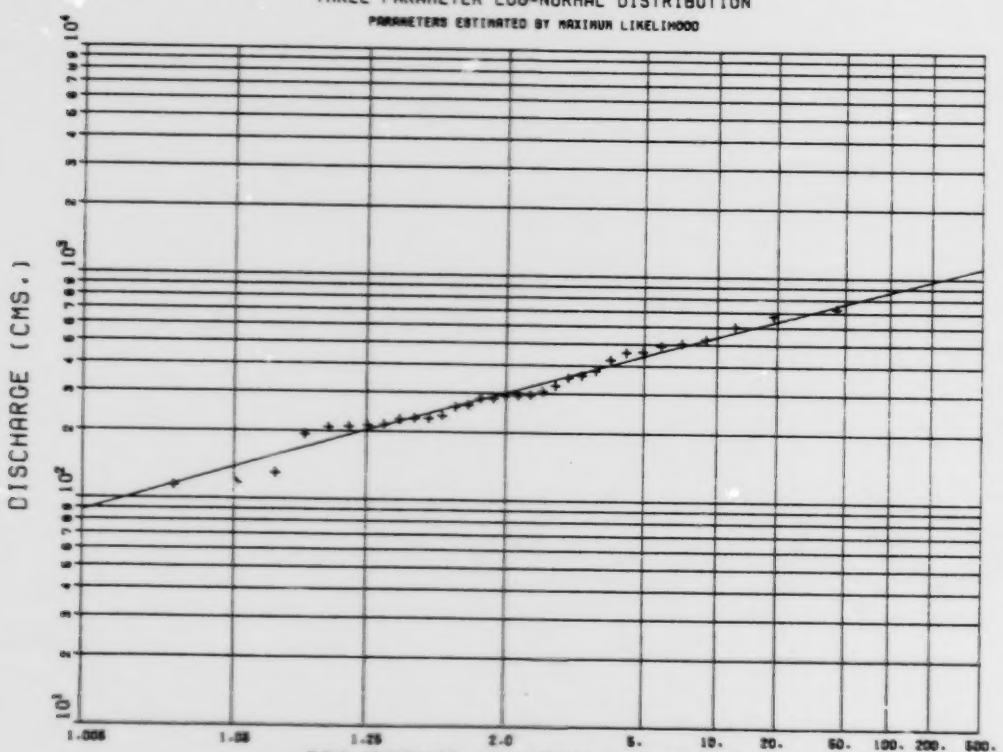
SAMPLE STATISTICS
MEAN = 330. S.D. = 153.7 C.S. = .9576 C.K. = 3.7571
SAMPLE STATISTICS (LOGS)
MEAN = 5.6960 S.D. = .4639 C.S. = -.0934 C.K. = 3.1393
SAMPLE MIN = 114. SAMPLE MAX = 728. N = 33

PARAMETERS FOR GUMBEL I A = .374738 U = 261.
PARAMETERS FOR LOGNORMAL P = 5.6960 S = .4639
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -10. M = 5.7321 S = .4473
STATISTICS OF LOG(X-A)
MEAN = 5.7321 S.D. = .4473 C.S. = -.0501 C.K. = 3.1044
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0217 B = .4589E+03 LOG(M) = 15.6320
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .6150E+07 A = -.0278 B = .2703E+03
LOG(M)F=13.2082 M = .5448E+06
DISTRIBUTION STATISTICS MEAN = 5.6960 S.D. = .4569 C.S. = -.1216

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	70.		98.		88.		87.		87.	
1.050	134.		139.		138.		138.		137.	
1.250	207.		201.		202.		203.		202.	
2.000	303.		298.		299.		300.		300.	
2.330	328.	7.72	323.	8.14	324.	8.51	326.	8.55	326.	8.71
5.000	433.	8.29	440.	9.40	440.	9.27	438.	9.00	441.	9.21
10.000	519.	8.88	539.	10.90	538.	11.00	531.	10.30	537.	10.60
20.000	601.	9.37	638.	12.40	634.	13.20	621.	12.50	630.	12.90
50.000	708.	9.98	772.	14.20	764.	16.40	738.	16.10	754.	16.80
100.000	788.	10.20	876.	15.50	864.	18.80	827.	19.30	848.	20.10
200.000	867.	10.50	983.	16.80	967.	21.20	917.	22.70	944.	23.60
500.000	972.	10.80	1130.	18.30	1110.	24.30	1040.	27.30	1070.	28.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MICHIPICOTEN RIVER AT HIGH FALLS (1934 - 1966) 02BD002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I200.0

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

MICHIPICOTEN RIVER AT HIGH FALLS (1950 - 1982) 02BD002

DRAINAGE AREA : 5130.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD: 1934 -3 1982

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	259.	144.	1.636	6.070
LN X SERIES	5.43	.49	.508	3.131
LN (X-A) SERIES	5.00	.72	-.020	3.011

3 PARAMETER LOGNORMAL WITH CENSORING

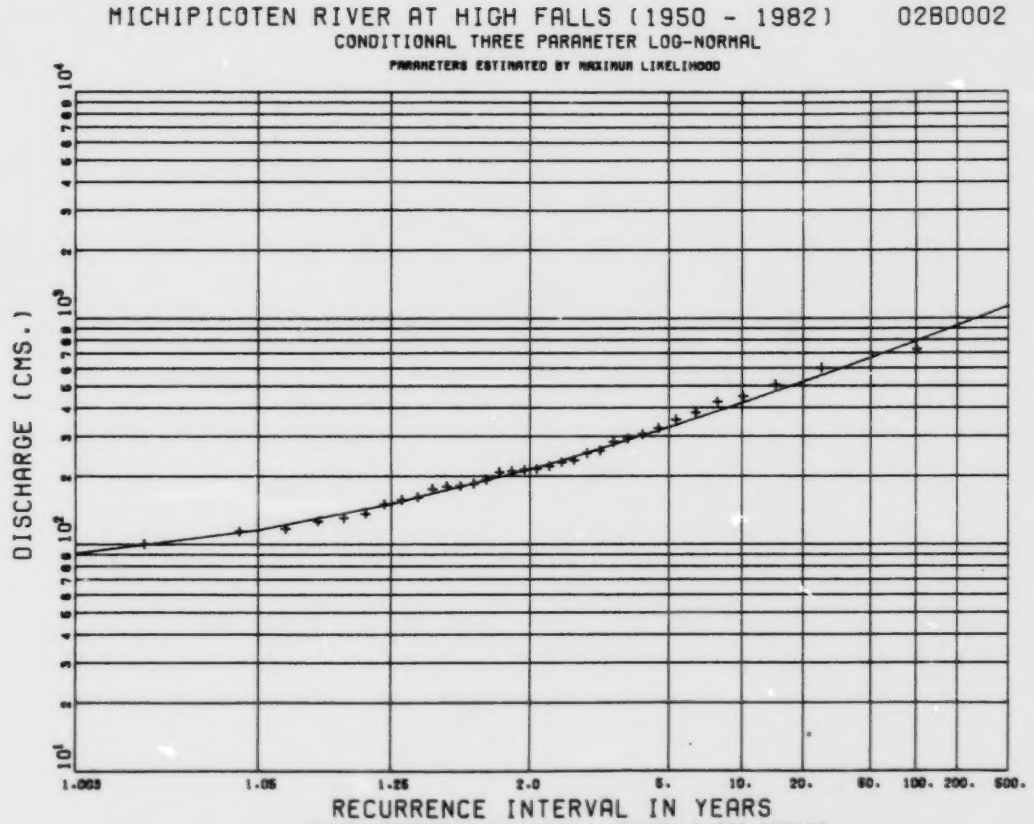
PARAMETERS A = 68.9600 M = 4.9753 S = .6903

MEAN = 253. SD = 144. CS = 2.821 CK = 19.861

UPPER LIMIT X = 97.5000
LOWER LIMIT X = -2.5000

FLOOD FREQUENCY REGIME

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD
1.003	.997	91.
1.050	.952	115.
1.250	.800	150.
2.000	.500	214.
2.330	.429	233.
5.000	.200	328.
10.000	.100	420.
20.000	.050	526.
50.000	.020	667.
100.000	.010	784.
200.000	.005	925.
500.000	.002	1130.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I200.1

MIDDLE MAITLAND RIVER NEAR BELGRAVE · 02FE008

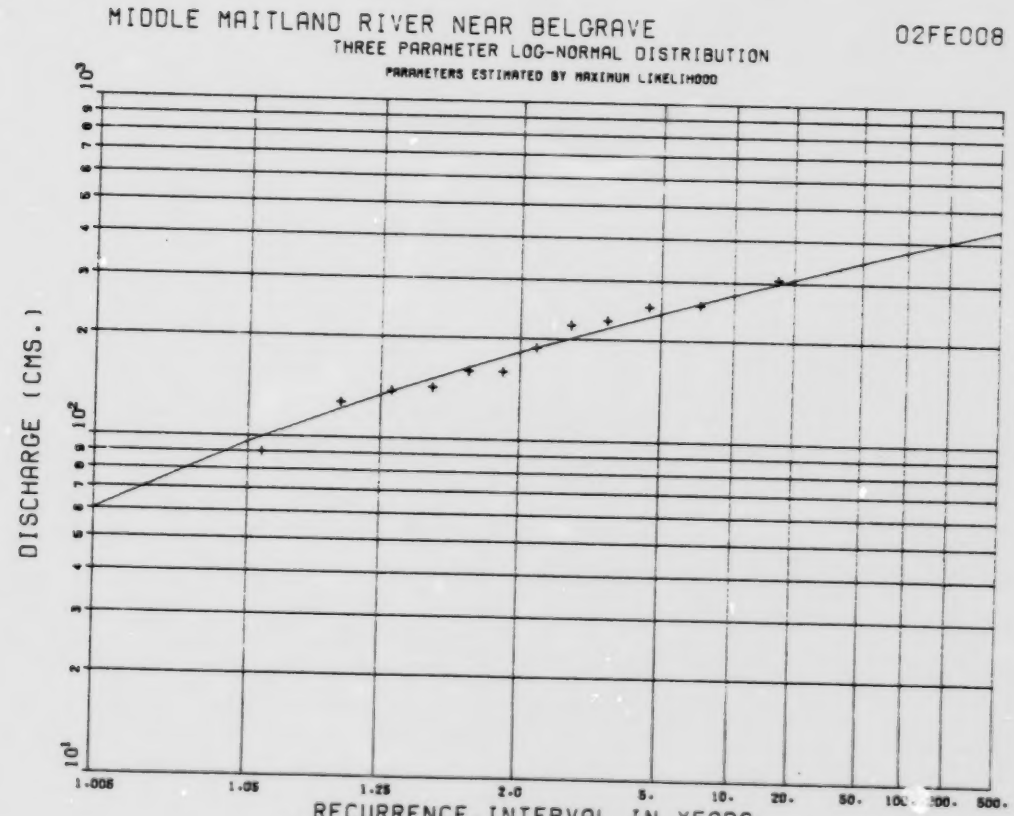
DRAINAGE AREA : 648.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 189. S.D. = 63.7 C.S. = .3265 C.K. = 3.3484
SAMPLE STATISTICS (LOGS)
MEAN = 5.1846 S.D. = .3530 C.S. = -.3151 C.K. = 3.6591
SAMPLE MIN = 90. SAMPLE MAX = 306. N = 12

PARAMETERS FOR GUMBEL I A = .019026 U = 159.
PARAMETERS FOR LOGNORMAL M = 5.1846 S = .3530
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -90. M = 5.6051 S = .2306
STATISTICS OF LOG(X-A)
MEAN = 5.6051 S.D. = .2306 C.S. = -.0747 C.K. = 3.3506
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0556 B = .4029E+02 LOG(M) = 7.4248
ME= .1677E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1336 B = .6835E+01
LOG(M)F= 6.9976 M = .4448E+03
DISTRIBUTION STATISTICS MEAN = 5.1846 S.D. = .3492 C.S. = -.7650

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	71.		72.		60.		57.		66.	
1.050	101.		100.		96.		94.		97.	
1.250	134.		133.		134.		136.		134.	
2.000	178.		178.		182.		186.		182.	
2.330	189.	10.20	190.	10.30	193.	10.50	194.	9.96	193.	11.90
5.000	238.	11.50	240.	11.90	242.	10.70	241.	9.17	241.	10.90
10.000	277.	12.60	281.	13.80	275.	12.20	269.	9.11	277.	12.10
20.000	315.	13.60	319.	15.60	307.	14.50	291.	9.64	309.	14.50
50.000	364.	14.70	369.	18.00	347.	17.90	316.	11.20	347.	18.90
100.000	401.	15.30	406.	19.60	375.	20.70	331.	12.70	374.	22.70
200.000	437.	15.90	443.	21.20	402.	23.50	344.	14.50	393.	26.80
500.000	486.	16.50	493.	23.10	438.	27.10	359.	17.10	432.	32.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I201.0

MIDDLE MAITLAND RIVER NEAR LISTOWEL 02FE003

DRAINAGE AREA : 77.7 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1963 - 1979

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	37.	18.	.543	3.011
LN X SERIES	3.49	.57	-1.097	5.399

X(MIN)= 7. CMS. TOTAL SAMPLE SIZE= 27
X(MAX)= 79. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

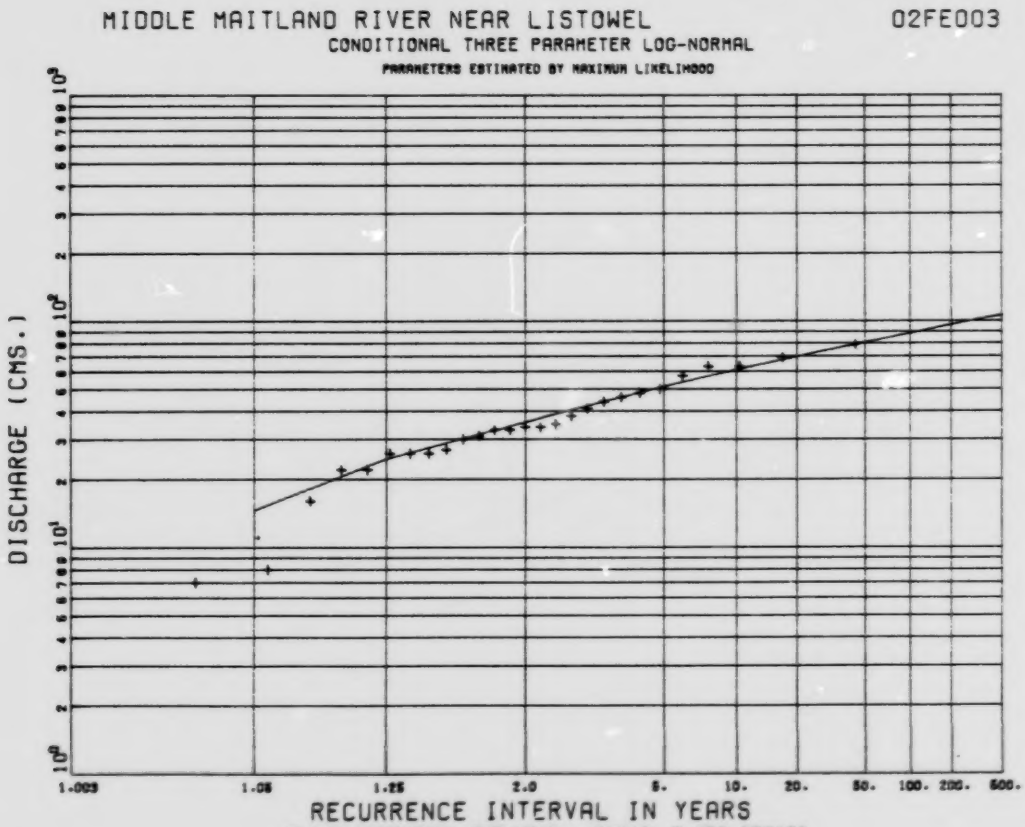
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	39.	17.	.665	3.686
LN X SERIES	3.55	.49	-.860	5.636
LN (X-A) SERIES	4.13	.26	-.038	3.673

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -26.0150 M = 4.1341 S = .2613

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	15.
1.250	.800	25.
2.000	.500	36.
2.330	.429	39.
5.000	.200	51.
10.000	.100	61.
20.000	.050	70.
50.000	.020	80.
100.000	.010	88.
200.000	.005	96.
500.000	.002	106.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I202.0

MIDDLE THAMES RIVER AT THAMESFORD 02GD004

DRAINAGE AREA : 306.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1946 - 1982

SAMPLE STATISTICS
MEAN = 106. S.D. = 68.9 C.S. = 2.5071 C.K. = 13.3132
SAMPLE STATISTICS (LOGS)
MEAN = 4.4479 S.D. = .6261 C.S. = -.5375 C.K. = 4.5196
SAMPLE MIN = 19. SAMPLE MAX = 412. N = 37

PARAMETERS FOR GUMBEL I A = .022189 U = 79.
PARAMETERS FOR LOGNORMAL M = 4.4879 S = .6261
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -27. M = 4.7843 S = .4550
STATISTICS OF LOG(X-A)
MEAN = 4.7843 S.D. = .4550 C.S. = .3955 C.K. = 4.4275
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1683 B = .1385E+02 LOG(M) = 6.8176
ME= .9138E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3910 B = .4547E+02
LOG(M)= 8.6271 M = .5581E+04
DISTRIBUTION STATISTICS MEAN = 4.4479 S.D. = .6138 C.S. = -.2966

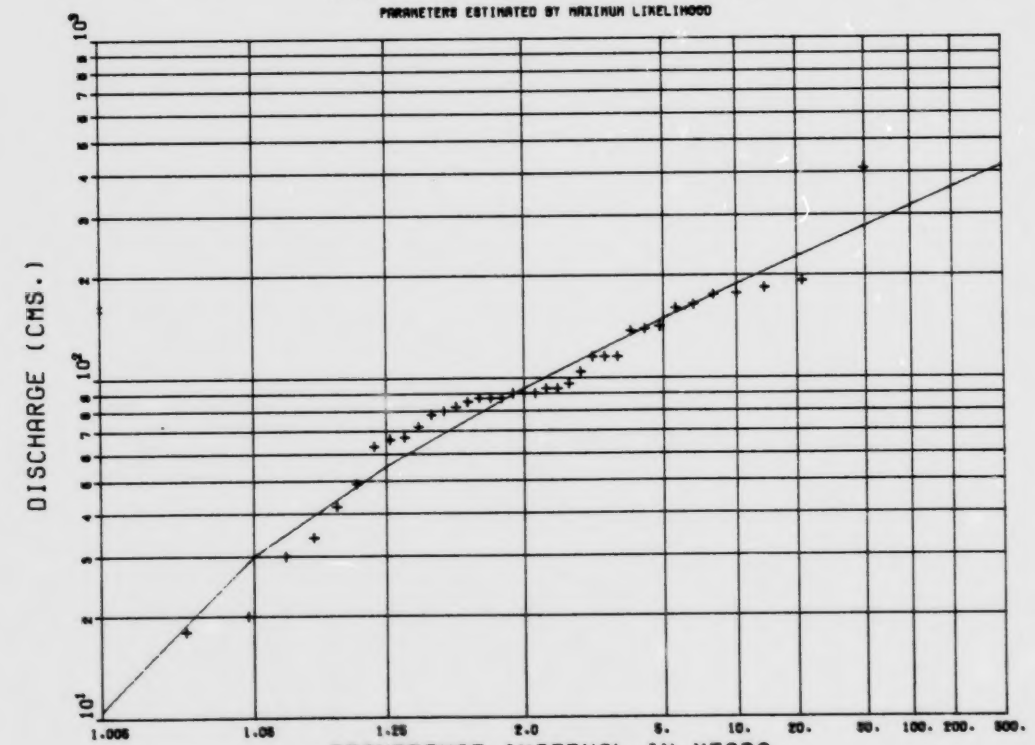
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	4.		18.		11.		15.		13.	
1.050	29.		32.		30.		31.		29.	
1.250	58.		53.		55.		54.		54.	
2.000	96.		89.		93.		92.		94.	
2.330	105.	8.94	99.	10.40	103.	9.97	102.	10.70	105.	11.10
5.000	147.	9.11	151.	12.30	149.	10.30	150.	10.80	152.	10.20
10.000	180.	9.49	198.	13.90	188.	11.90	191.	12.00	193.	10.90
20.000	213.	9.84	249.	15.80	226.	14.30	231.	14.10	235.	11.20
50.000	255.	10.20	322.	18.20	279.	17.00	284.	18.00	287.	13.70
100.000	286.	10.50	382.	19.80	319.	19.30	324.	21.30	328.	21.70
200.000	318.	10.70	446.	21.40	360.	21.60	365.	24.90	327.	26.00
500.000	359.	10.90	540.	23.40	417.	24.50	419.	30.00	364.	31.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MIDDLE THAMES RIVER AT THAMESFORD 02GD004

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I203.0

MILLHAVEN CREEK NEAR MILLHEAVEN 02HM006

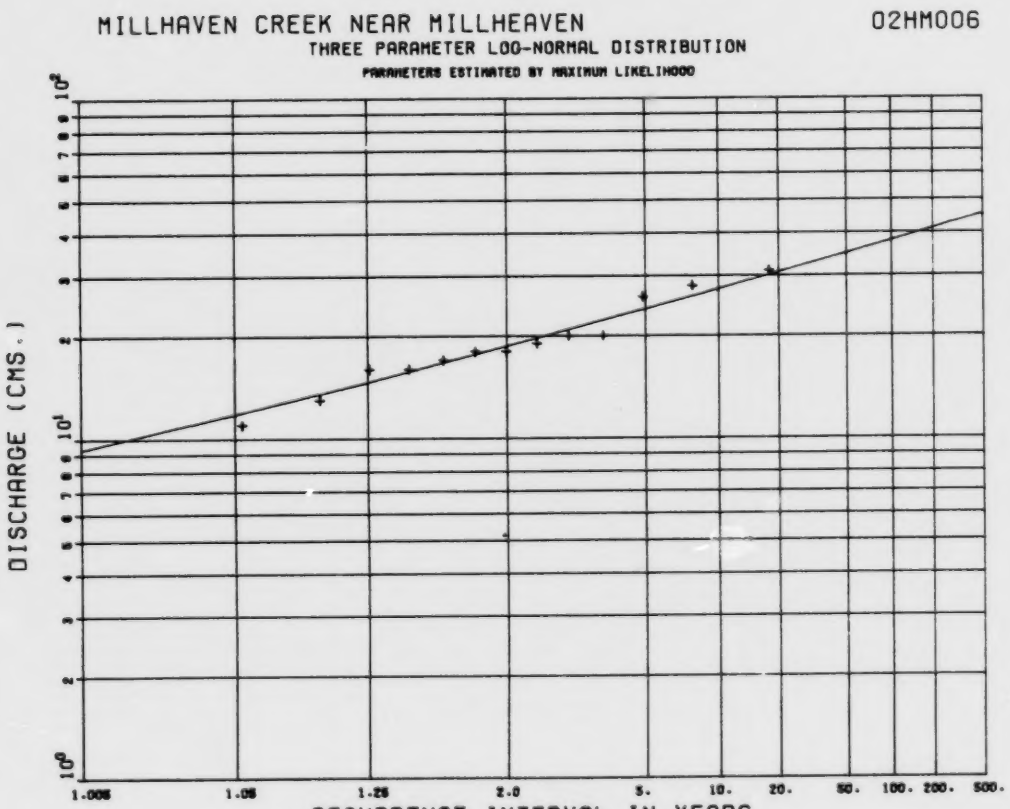
DRAINAGE AREA : 150.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1971 - 1983

SAMPLE STATISTICS
MEAN = 19. S.D. = 5.8 C.S. = .7543 C.K. = 4.0354
SAMPLE STATISTICS (LOGS)
MEAN = 2.9294 S.D. = .2902 C.S. = .0913 C.K. = 3.9184
SAMPLE MIN.= 11. SAMPLE MAX = 31. N = 13

PARAMETERS FOR GUMBEL I A = .224041 U = 17.
PARAMETERS FOR LOGNORMAL M = 2.9294 S = .2902
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 2.7664 S = .3411
STATISTICS OF LOG(X-A)
MEAN = 2.7664 S.D. = .3411 C.S. = -.0434 C.K. = 4.1186
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0132 B = .4300E+03 LOG(M) =-3.4232
ME= .3241E-01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0161 B = .3014E+03
LOG(M)E=-1.9132 M = .1476E+00
DISTRIBUTION STATISTICS MEAN = 2.9294 S.D. = .2785 C.S. = .1152

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	9.		9.		9.		9.		9.	
1.050	12.		12.		12.		12.		12.	
1.250	15.		15.		15.		15.		15.	
2.000	19.		19.		19.		19.		19.	
2.330	20.	8.06	20.	8.11	20.	8.71	20.	8.41	20.	8.75
5.000	24.	9.46	24.	9.37	24.	9.77	24.	9.32	24.	9.64
10.000	27.	10.60	27.	10.90	27.	11.80	27.	11.20	27.	11.50
20.000	30.	11.60	30.	12.30	31.	14.50	30.	13.90	30.	14.30
50.000	34.	12.70	34.	14.20	35.	18.40	34.	18.20	35.	19.80
100.000	37.	13.40	37.	15.50	38.	21.60	37.	21.90	38.	22.50
200.000	41.	14.00	40.	16.70	41.	24.60	40.	25.80	41.	26.50
500.000	45.	14.60	43.	18.30	45.	28.70	44.	31.10	45.	32.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I204.0

MIMICO CREEK AT ISLINGTON 02HC033

DRAINAGE AREA : 63.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1982

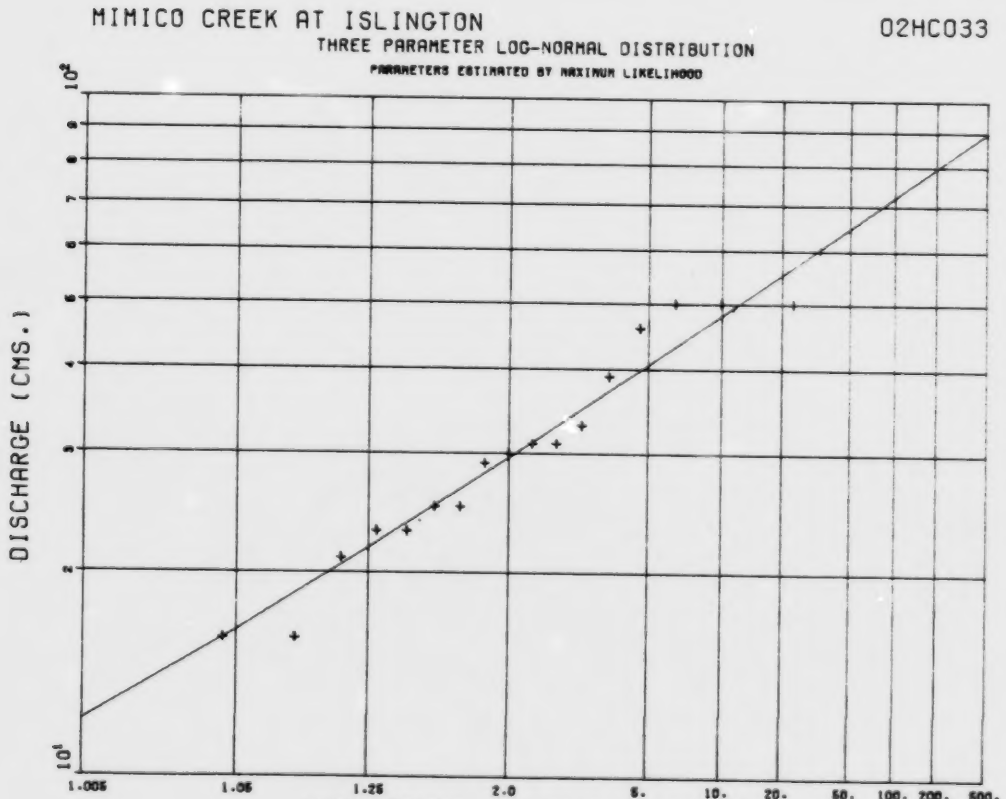
SAMPLE STATISTICS
MEAN = 32. S.D. = 11.5 C.S. = .5155 C.K. = 2.7579
SAMPLE STATISTICS (LOGS)
MEAN = 3.3917 S.D. = .3683 C.S. = -.0472 C.K. = 2.8740
SAMPLE MIN = 16. SAMPLE MAX = 50. N = 17

PARAMETERS FOR GUMBEL I A = .110484 U = 26.
PARAMETERS FOR LOGNORMAL M = 3.3917 S = .3683
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 3.2821 S = .4107
STATISTICS OF LOG(X-A)
MEAN = 3.2821 S.D. = .4107 C.S. = -.1245 C.K. = 2.9406
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0087 B = .1794E+04 LOG(M) =18.9926
ME= .1772E+09

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	11.		12.		12.		0.		11.	
1.050	16.		16.		16.		0.		16.	
1.250	22.		22.		22.		0.		22.	
2.000	30.		30.		30.		0.		30.	
2.330	32.	8.81	32.	9.00	32.	9.62	0.	0.00	32.	9.65
5.000	40.	9.90	41.	10.40	41.	10.80	0.	0.00	41.	10.30
10.000	47.	10.90	48.	12.10	48.	13.00	0.	0.00	48.	12.00
20.000	53.	11.70	55.	13.70	55.	15.80	0.	0.00	54.	14.70
50.000	62.	12.50	63.	15.80	65.	19.90	0.	0.00	63.	19.10
100.000	68.	13.00	70.	17.20	72.	23.00	0.	0.00	69.	22.90
200.000	74.	13.50	77.	18.60	80.	26.10	0.	0.00	76.	26.90
500.000	83.	14.00	86.	20.30	90.	30.20	0.	0.00	84.	32.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I205.0

MISSINAIBI RIVER AT MATTICE 04LJ001

DRAINAGE AREA = 8940.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1920 - 1982

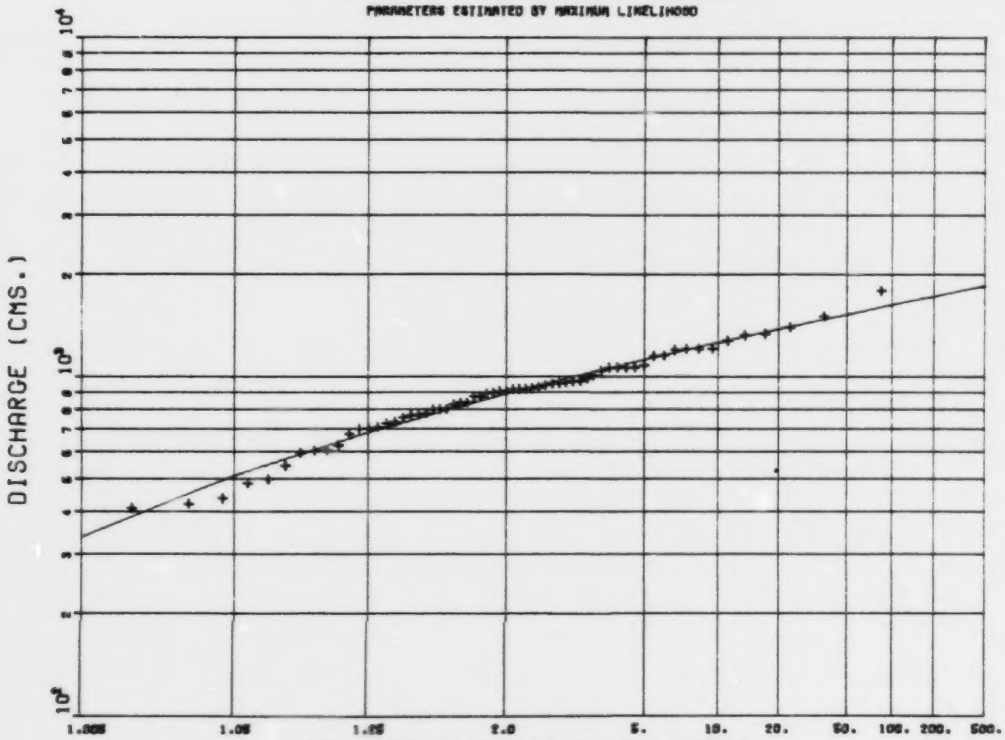
SAMPLE STATISTICS
MEAN = 909. S.D. = 267.2 C.S. = .5697 C.K. = 4.1757
SAMPLE STATISTICS (LOGS)
MEAN = 6.7581 S.D. = .3054 C.S. = -.4431 C.K. = 3.5313
SAMPLE MIN = 409. SAMPLE MAX = 1790. N = 63

PARAMETERS FOR GUMBEL I A = .014238 U = 782.
PARAMETERS FOR LOGNORMAL M = 6.7581 S = .3054
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -736. M = 7.3924 S = .1611
STATISTICS OF LOG(X-A)
MEAN = 7.3924 S.D. = .1611 C.S. = .0071 C.K. = 3.4335
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0876 B = .2038E+02 LOG(P) = 8.1467
ME= .3452E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0549 B = .3031E+02
LOG(M)F= 8.4315 M = .4590E+04
DISTRIBUTION STATISTICS MEAN = 6.7581 S.D. = .3021 C.S. = -.3633

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	738.		396.		336.		362.		344.	
1.053	519.		526.		511.		514.		508.	
1.250	670.		673.		682.		679.		679.	
2.000	869.		870.		888.		886.		889.	
2.330	919.	4.11	918.	3.88	936.	3.91	934.	4.01	938.	4.13
5.000	1140.	4.72	1127.	4.48	1120.	3.92	1130.	4.10	1130.	3.95
10.000	1310.	5.23	1290.	5.19	1260.	4.44	1260.	4.37	1260.	4.28
20.000	1480.	5.67	1440.	5.90	1380.	5.24	1380.	5.08	1380.	5.13
50.000	1700.	6.14	1630.	6.78	1520.	6.50	1520.	6.41	1510.	6.78
100.000	1870.	6.43	1770.	7.41	1630.	7.21	1620.	7.58	1500.	8.23
200.000	2030.	6.69	1910.	7.99	1720.	8.54	1710.	8.85	1680.	9.79
500.000	2250.	6.97	2100.	8.73	1850.	9.90	1820.	10.60	1790.	11.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSINAIBI RIVER AT MATTICE 04LJ001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I206.0

MISSINAIBI RIVER BELOW WABOOSE RIVER 04LM001

DRAINAGE AREA : 22900.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1973 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	2142.	539.	-.838	5.927
LN X SERIES	7.63	.30	-1.454	8.133

X(MIN)= 1050. CMS. TOTAL SAMPLE SIZE= 10
X(MAX)= 2857. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	2264.	402.	-.323	5.204
LN X SERIES	7.71	.19	-.652	5.617
LN (X-A) SERIES	7.58	.20	-.064	5.274

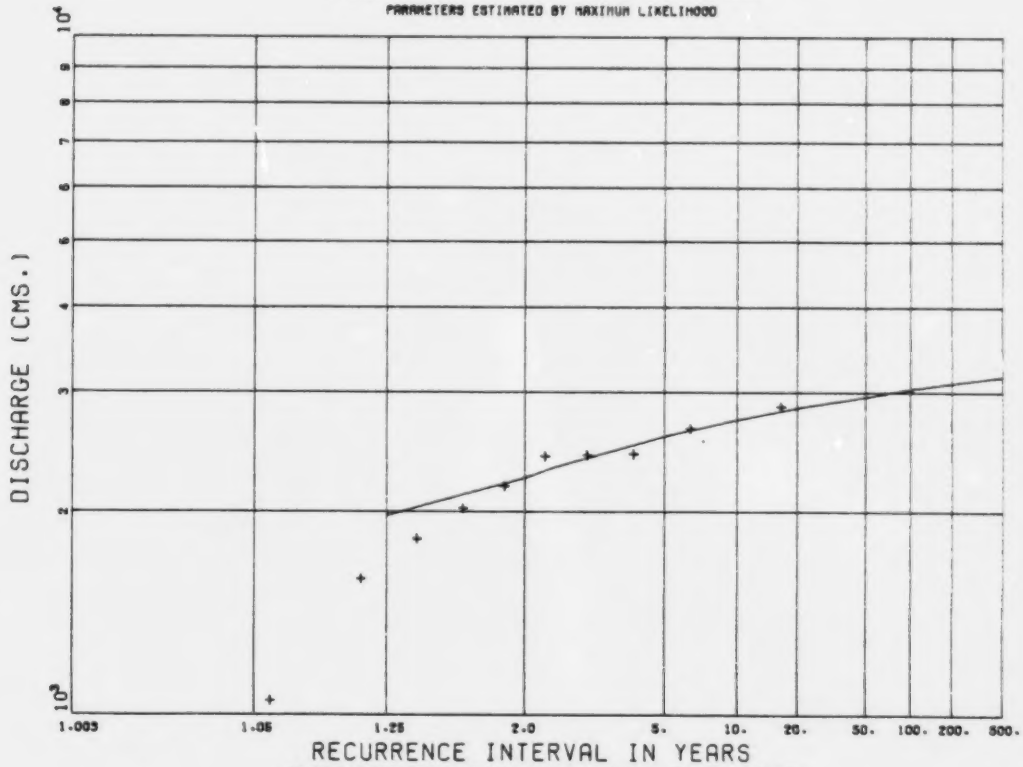
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 4258.6459 M = 7.5802 S = .2025

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	1970.
2.000	.500	2240.
2.330	.429	2320.
5.000	.200	2580.
10.000	.100	2730.
20.000	.050	2840.
50.000	.020	2950.
100.000	.010	3030.
200.000	.005	3090.
500.000	.002	3160.

MISSINAIBI RIVER BELOW WABOOSE RIVER 04LM001
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I207.0

MISSISSAGI RIVER AT RAYNER GENERATIN, STATION 02CC007

DRAINAGE AREA 5840.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD: 1951 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	381.	179.	.363	3.925
LN X SERIES	5.87	.42	-1.235	5.368

X(MIN)= 90. CMS. TOTAL SAMPLE SIZE= 33
X(MAX)= 731. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

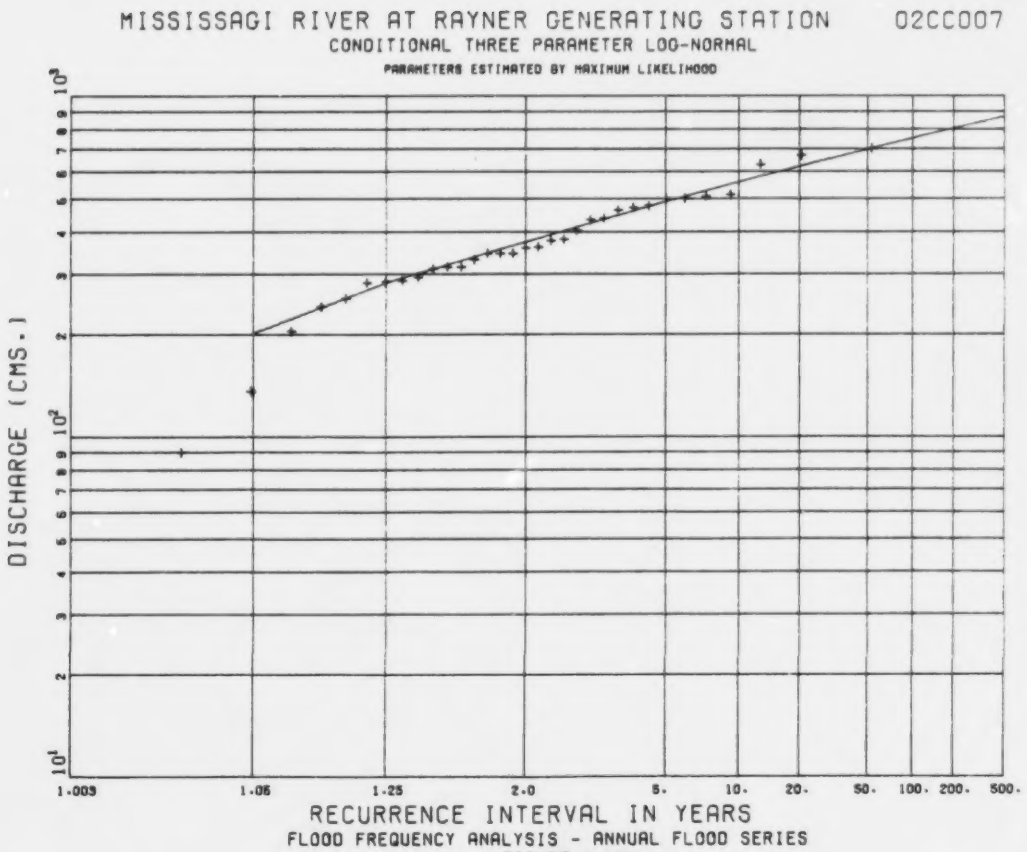
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	391.	179.	.617	3.914
LN X SERIES	5.91	.35	-.498	4.523
LN (X-A) SERIES	6.40	.21	.006	3.723

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -226.3092 M = 4.4027 S = .2079

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.150	.852	201.
1.250	.611	242.
2.000	.500	372.
2.330	.429	395.
5.000	.200	489.
10.000	.100	558.
20.000	.050	622.
50.000	.020	696.
100.000	.010	750.
200.000	.005	812.
500.000	.002	869.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I208.0

MISSISSAGI RIVER AT MISSISSAGI 02CC004

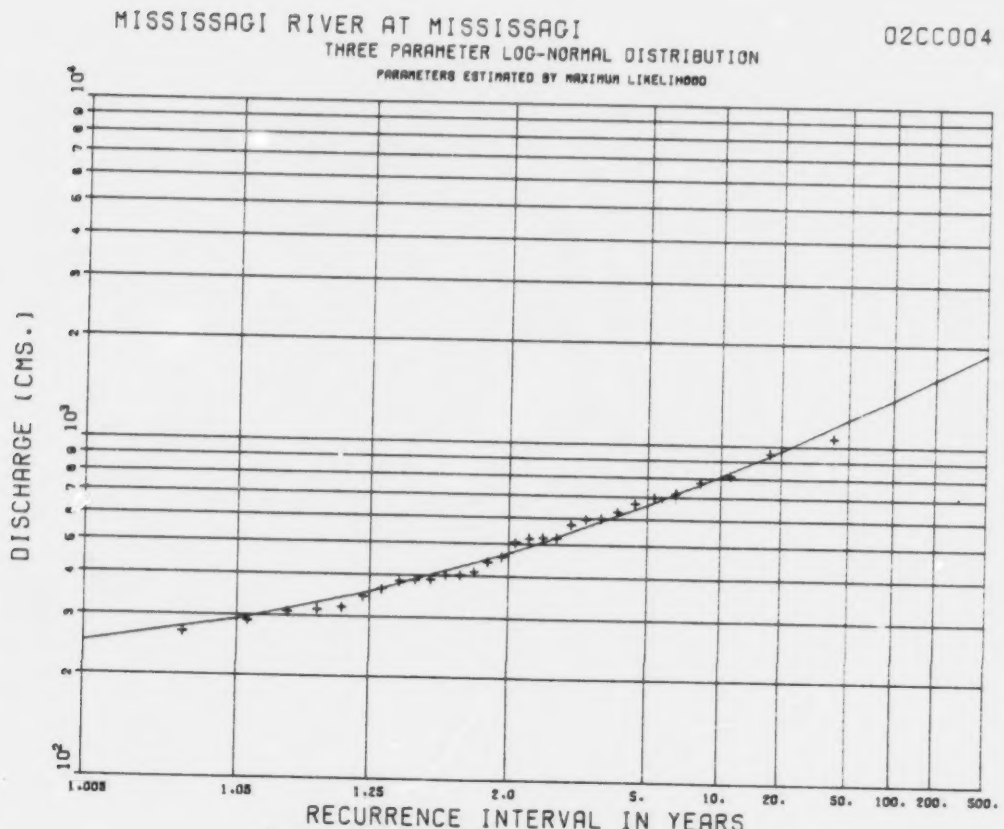
DRAINAGE AREA : 9270.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1921 - 1953

SAMPLE STATISTICS
MEAN = 521. S.D. = 199.5 C.S. = 1.3164 C.K. = 3.9993
SAMPLE STATISTICS (LOGS)
MEAN = 6.1909 S.D. = .3623 C.S. = .3212 C.K. = 2.6931
SAMPLE MIN = 267. SAMPLE MAX = 1060. N = 30

PARAMETERS FOR GUMBEL I A = .006938 U = 433.
PARAMETERS FOR LOGNORMAL M = 6.1909 S = .3623
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 196. M = 5.5991 S = .6367
STATISTICS OF LOG(X-A)
MEAN = 5.5991 S.D. = .6367 C.S. = -.1693 C.K. = 2.7047
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0582 B = .3978E+02 LOG(M) = 3.9347
ME= .5114E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1471 B = .6273E+01
LOG(M)E= 5.2984 M = .1941E+03
DISTRIBUTION STATISTICS MEAN = 6.1909 S.D. = .3634 C.S. = .7335

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	193.		192.		249.		247.		214.	
1.050	273.		269.		291.		293.		279.	
1.250	364.		360.		354.		357.		358.	
2.000	486.		488.		466.		465.		479.	
2.330	516.	6.46	521.	6.67	499.	7.40	497.	7.14	511.	7.31
5.000	649.	7.30	662.	7.72	658.	9.50	650.	9.38	658.	8.38
10.000	757.	8.03	777.	8.33	807.	12.20	798.	12.30	785.	10.40
20.000	861.	8.64	886.	10.10	966.	15.30	960.	15.90	914.	13.10
50.000	995.	9.30	1030.	11.70	1200.	19.60	1210.	21.10	1090.	17.90
100.000	1100.	9.70	1130.	12.70	1381.	22.80	1420.	25.30	1230.	21.70
200.000	1200.	10.10	1240.	13.70	1590.	26.90	1660.	29.90	1390.	25.80
500.000	1330.	10.40	1390.	15.00	1891.	30.00	2030.	35.90	1600.	31.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I209.0

MISSISSAGI RIVER AT MISSISSAGI CHUTE 02CC008

DRAINAGE AREA : 9300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1962 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	552	188	.869	4.478
LN X SERIES	6.27	.331	-.244	4.882

X(MIN)= 251. CMS. TOTAL SAMPLE SIZE= 21
X(MAX)= 962. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	567.	178.	1.168	5.127
LN X SERIES	6.31	.26	.477	4.204
LN (X-A) SERIES	5.87	.48	.034	4.432

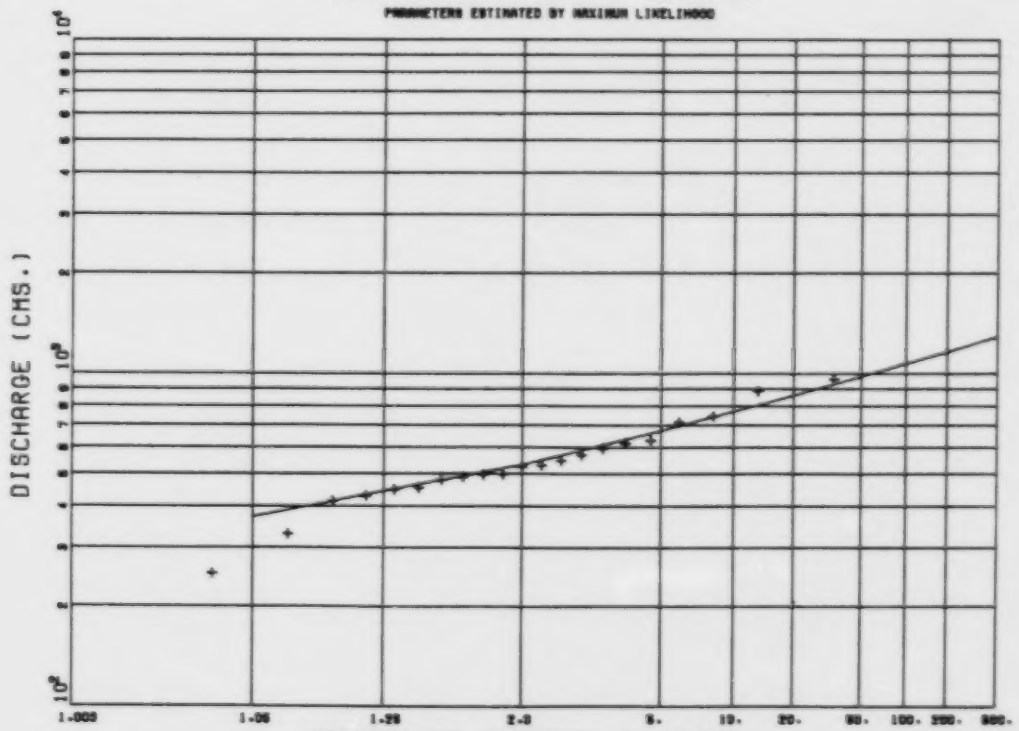
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 185.2472 M = 5.8707 S = .3961

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	378.
1.250	.800	443.
2.000	.500	531.
2.330	.429	556.
5.000	.200	673.
10.000	.100	768.
20.000	.050	859.
50.000	.020	979.
100.000	.010	1070.
200.000	.005	1160.
500.000	.002	1290.

MISSISSAGI RIVER AT MISSISSAGI CHUTE 02CC008
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I210.0

MISSISSAGI RIVER AT RED ROCK FALLS 02CC009

DRAINAGE AREA : 9810.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1962 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	520.	225.	.305	5.638
LN X SERIES	6.14	.43	-2.788	15.342

X(MIN)= 50. CMS. TOTAL SAMPLE SIZE= 20
X(MAX)= 1000. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

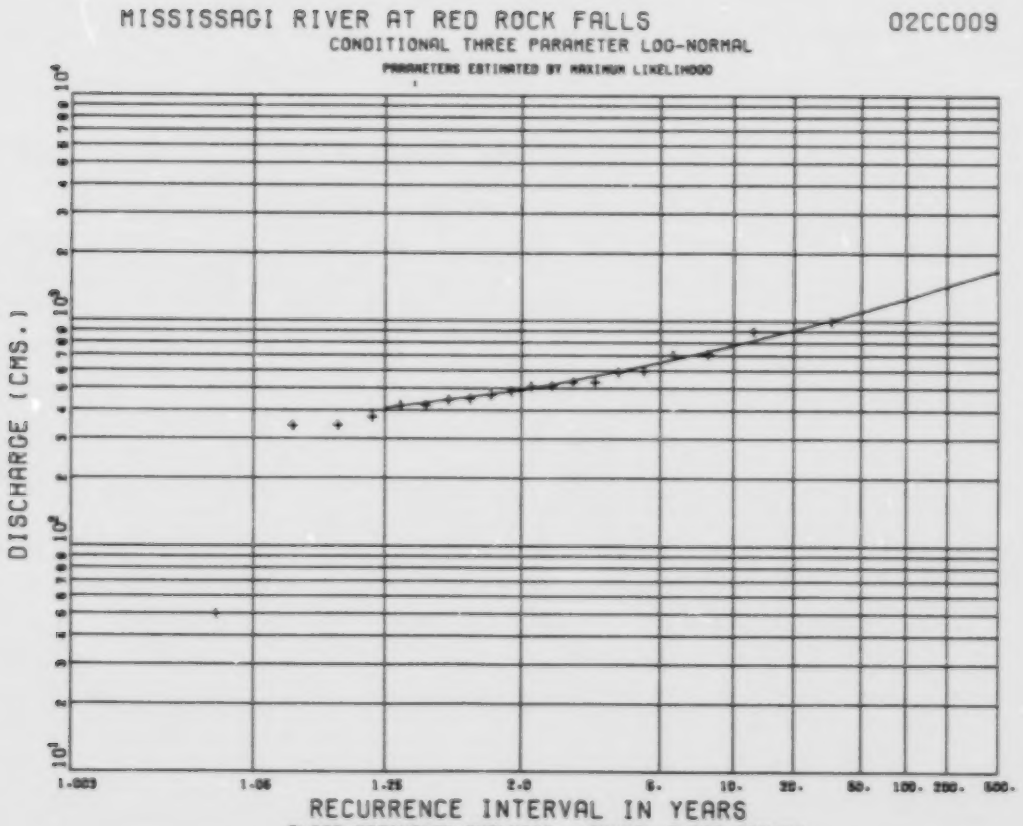
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	545.	177.	1.339	5.564
LN X SERIES	6.26	.33	.685	4.356
LN (X-A) SERIES	5.43	.64	-.111	3.698

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 269.7780 M = 5.4318 S = .6367

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	487.
2.000	.500	689.
2.330	.429	717.
5.000	.200	851.
10.000	.100	977.
20.000	.050	911.
50.000	.020	1100.
100.000	.010	1250.
200.000	.005	1440.
500.000	.002	1680.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1211.0

MISSISSAGI RIVER AT ROCKY ISLAND LAKE 02CB002

DRAINAGE AREA = 7110. SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1951 - 1967

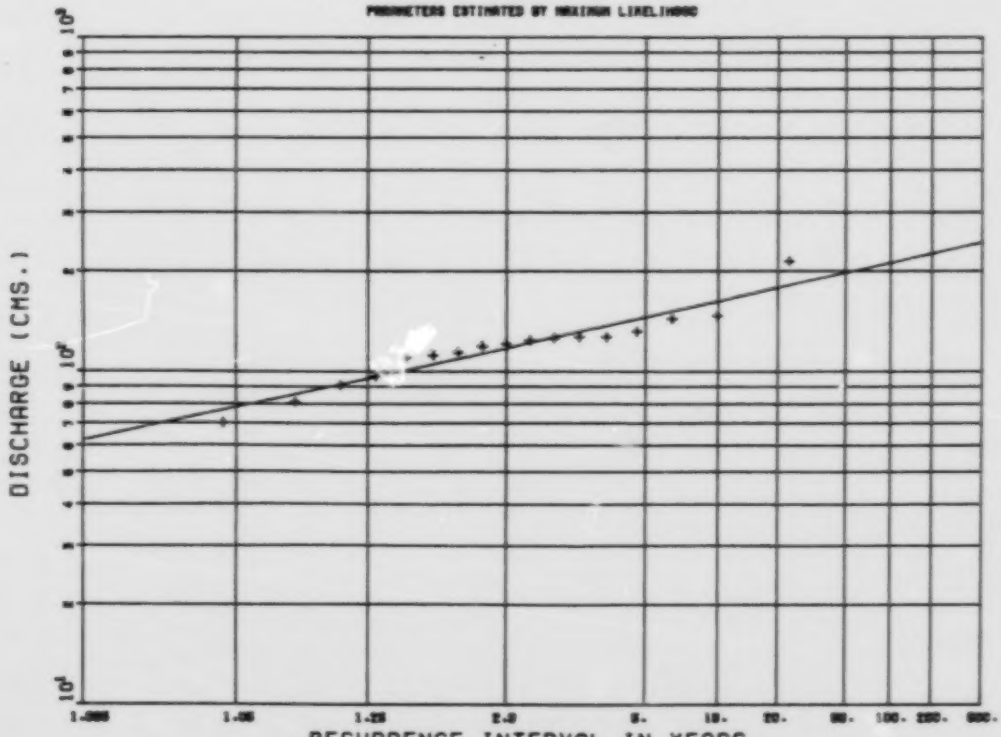
SAMPLE STATISTICS
MEAN = 121. S.D. = 31.6 C.S. = 1.3403 C.K. = 7.8369
SAMPLE STATISTICS (LOGS)
MEAN = 4.7654 S.D. = .2502 C.S. = .1202 C.K. = 5.3577
SAMPLE MIN = 78. SAMPLE MAX = 214. N = 17

PARAMETERS FOR GUMBEL I A = .039798 U = 107.
PARAMETERS FOR LOGNORMAL M = 4.7654 S = .2502
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 4.7218 S = .2613
STATISTICS OF LOG(X-A)
MEAN = 4.7218 S.D. = .2613 C.S. = .0714 C.K. = 5.3172
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8150 B = .2767E+03 LOG(P) = .6033
ME= .1828E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0081 B = .8891E+03
LOG(P)F=-2.4709 M = .8451E-01
DISTRIBUTION STATISTICS MEAN = 4.7654 S.D. = .2427 C.S. = .0671

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.075	85.		82.		82.		84.		83.	
1.053	78.		78.		78.		79.		79.	
1.250	95.		95.		95.		96.		95.	
2.000	116.		117.		117.		117.		117.	
2.333	122.	6.35	123.	6.12	123.	6.52	122.	6.39	122.	6.61
5.000	145.	7.58	145.	7.06	145.	7.14	144.	7.22	145.	7.32
10.000	164.	8.61	162.	8.19	162.	8.51	160.	8.34	162.	8.80
20.000	182.	9.48	177.	9.31	179.	10.40	176.	10.30	179.	10.90
50.000	205.	10.40	196.	10.70	197.	13.20	195.	13.50	199.	14.40
100.000	223.	11.10	210.	11.70	211.	15.40	209.	16.20	215.	17.30
200.000	240.	11.60	224.	12.60	225.	17.70	223.	19.00	230.	20.40
500.000	263.	12.20	241.	13.80	243.	20.70	241.	23.00	253.	24.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSISSAGI RIVER AT ROCKY ISLAND LAKE 02CB002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : II12 0

MISSISSAGI RIVER BELOW AUBREY FALLS 02CB001

DRAINAGE AREA : 4040.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1966 - 1982

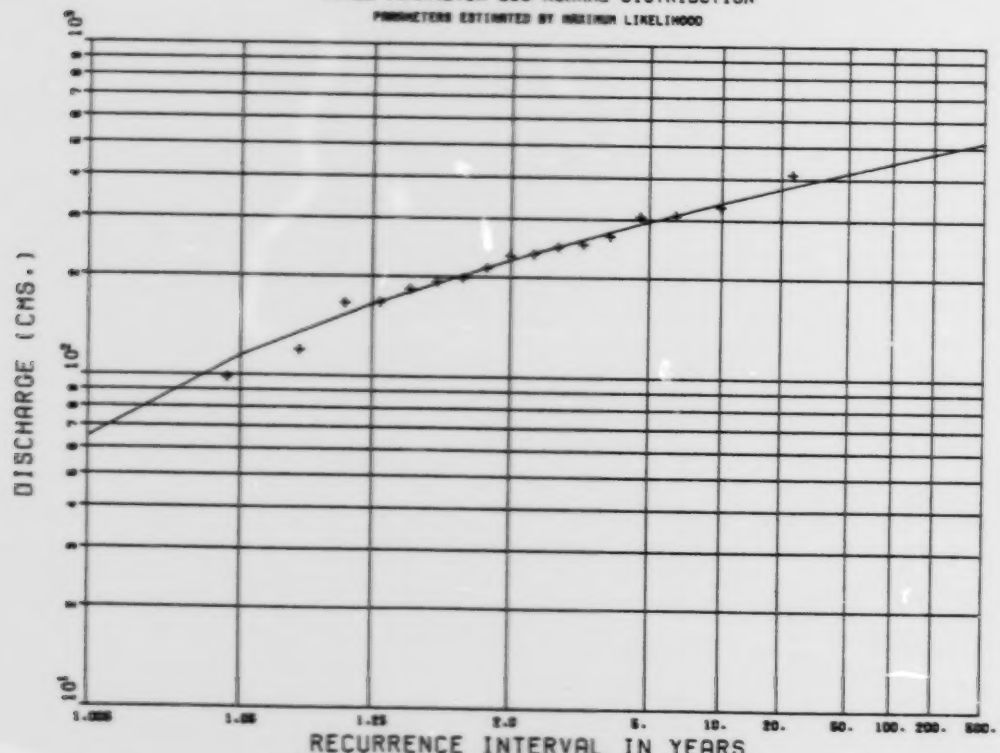
SAMPLE STATISTICS
MEAN = 231. S.D. = 79.0 C.S. = .4896 C.K. = 4.1310
SAMPLE STATISTICS (LOGS)
MEAN = 5.3836 S.D. = .3627 C.S. = -.5197 C.K. = 4.0949
SAMPLE MIN = 98. SAMPLE MAX = 413. N = 17

PARAMETERS FOR GUMBEL I A = .014819 U = 194.
PARAMETERS FOR LOGNORMAL M = 5.3836 S = .3627
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -206. M = 6.0647 S = .1802
STATISTICS OF LOG(X-A)
MEAN = 6.0647 S.D. = .1802 C.S. = -.0173 C.K. = 3.7599
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0943 B = .1481E+02 LOG(M) = 6.7795
ME= .8797E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0945 B = .1394E+02
LOG(M)F= 6.7007 M = .8130E+03
DISTRIBUTION STATISTICS MEAN = 5.3836 S.D. = .3528 C.S. = -.5357

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	82.		86.		65.		74.		72.	
1.050	119.		120.		114.		116.		114.	
1.250	162.		168.		164.		164.		163.	
2.000	219.		218.		224.		225.		225.	
2.500	233.	8.90	232.	8.87	239.	8.77	239.	8.80	239.	9.46
5.000	295.	9.99	296.	10.20	295.	8.66	295.	8.49	297.	8.81
10.000	346.	10.90	347.	11.90	336.	9.74	334.	8.91	338.	9.43
20.000	395.	11.70	396.	13.50	373.	11.40	367.	10.00	373.	11.40
50.000	457.	12.60	459.	15.50	417.	14.10	405.	12.30	414.	15.20
100.000	505.	13.10	506.	16.90	448.	16.20	431.	14.30	441.	18.60
200.000	552.	13.60	554.	18.30	478.	18.30	454.	16.60	466.	22.20
500.000	613.	14.10	619.	20.00	517.	21.10	482.	19.80	496.	27.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSISSAGI RIVER BELOW AUBREY FALLS 02CB001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I213.0

MISSISSAGUA RIVER BELOW MISSISSAGUA LAKE 02HH002

DRAINAGE AREA : 326.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1983

SAMPLE STATISTICS
MEAN = 25. S.D. = 7.8 C.S. = -.7085 C.K. = 3.8802
SAMPLE STATISTICS (LOGS)
MEAN = 3.1826 S.D. = .3209 C.S. = -.9626 C.K. = 3.4182
SAMPLE MIN = 14. SAMPLE MAX = 33. N = 12

PARAMETERS FOR GUMBEL I A = .146130 U = 22.
PARAMETERS FOR LOGNORMAL M = 3.1826 S = .3209

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1545 B = .4317E+01 LOG(M) = 3.8493
ME= .4696E+02

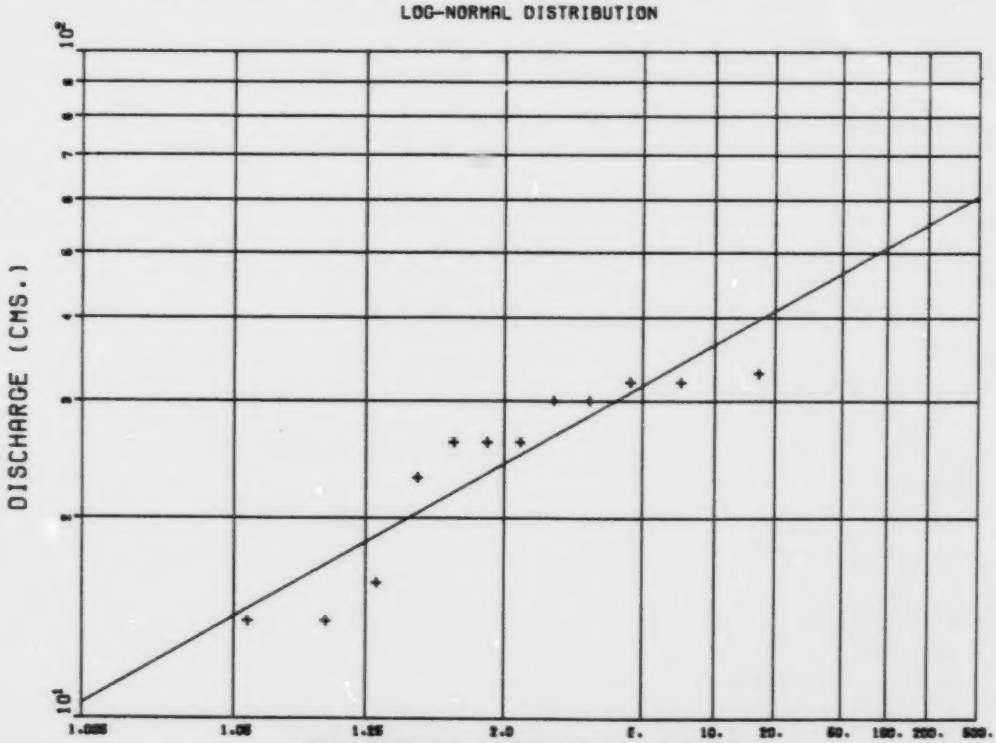
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	10.		11.		0.		0.		8.	
1.050	14.		14.		0.		0.		13.	
1.250	18.		18.		0.		0.		19.	
2.000	24.		24.		0.		0.		25.	
3.333	26.	9.79	26.	9.34	0.	0.00	0.	0.00	27.	10.10
5.000	32.	11.20	32.	10.80	0.	0.00	0.	0.00	32.	7.82
10.000	37.	12.30	36.	12.50	0.	0.00	0.	0.00	35.	6.38
20.000	42.	13.38	41.	14.20	0.	0.00	0.	0.00	37.	11.50
50.000	48.	14.48	47.	16.30	0.	0.00	0.	0.00	39.	17.10
100.000	53.	15.00	51.	17.80	0.	0.00	0.	0.00	41.	21.50
200.000	58.	15.60	55.	19.20	0.	0.00	0.	0.00	42.	25.80
500.000	64.	16.20	61.	21.60	0.	0.00	0.	0.00	43.	31.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSISSAGUA RIVER BELOW MISSISSAGUA LAKE 02HH002

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1214.0

MISSISSIPPI RIVER AT APPLETON 02KF006

DRAINAGE AREA : 2300.0 30. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1919 - 1982

SAMPLE STATISTICS
MEAN = 146. S.D. = 48.2 C.S. = .0902 C.K. = 2.5712
SAMPLE STATISTICS (LOGS)
MEAN = 4.9209 S.D. = .3654 C.S. = -.6285 C.K. = 2.9712
SAMPLE MIN = 49. SAMPLE MAX = 263. N = 64

PARAMETERS FOR GUMBEL I A = .022712 U = 122.
PARAMETERS FOR LOGNORMAL M = 4.9209 S = .3654
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -813. M = 6.8704 S = .0500
STATISTICS OF LOG(X-A)
MEAN = 6.8704 S.D. = .0500 C.S. = -.0117 C.K. = 2.5030
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1145 B = .1013E+02 LOG(M) = 6.0837
ME= .4397E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1652 B = .4969E+01
LOG(M)= 6.7417 M = .1116E+03
DISTRIBUTION STATISTICS MEAN = 4.9209 S.D. = .3682 C.S. = -.8372

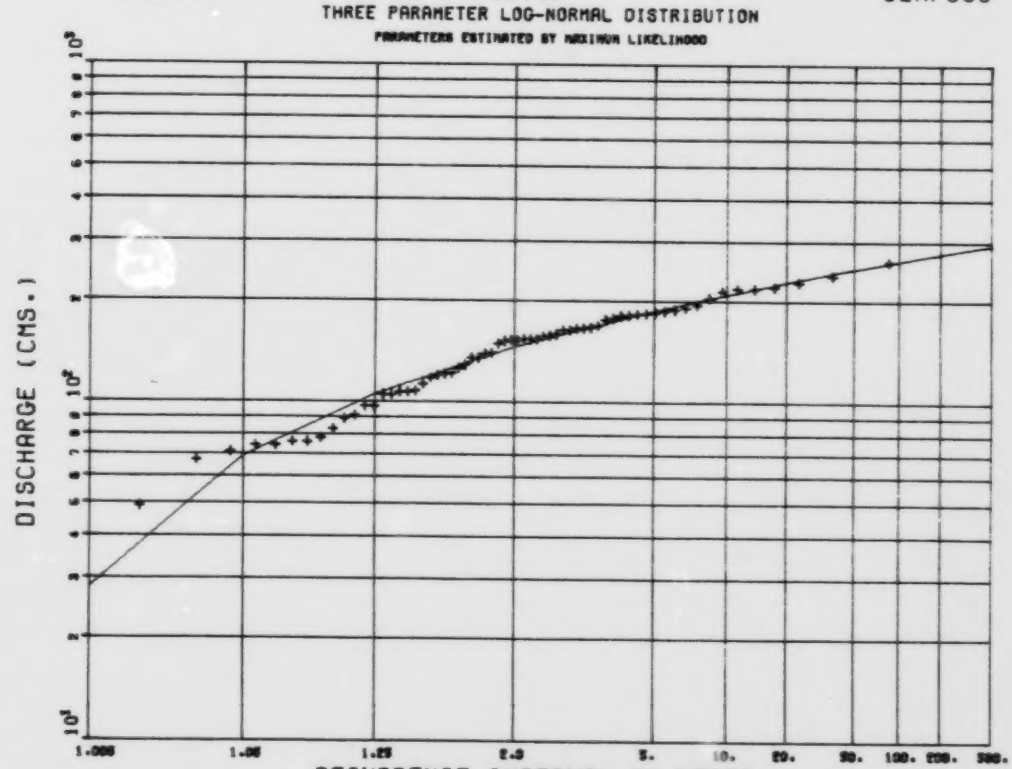
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	49.		54.		28.		39.		43.	
1.050	73.		75.		69.		69.		71.	
1.250	101.		101.		105.		103.		103.	
2.000	138.		137.		145.		145.		142.	
2.330	147.	4.73	146.	4.60	153.	4.29	154.	4.41	152.	4.92
5.000	188.	5.27	187.	5.32	186.	3.95	188.	3.95	187.	4.40
10.000	221.	5.75	219.	6.16	208.	4.24	209.	3.50	212.	4.65
20.000	253.	6.16	250.	7.01	227.	4.85	226.	3.47	237.	5.70
50.000	294.	6.59	290.	8.05	249.	5.87	243.	4.27	266.	7.81
100.000	325.	6.45	321.	8.79	263.	6.70	254.	4.75	291.	9.64
200.000	355.	7.08	351.	9.49	277.	7.55	263.	5.34	315.	11.50
500.000	396.	7.33	393.	10.40	294.	8.67	272.	6.21	341.	14.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSISSIPPI RIVER AT APPLETON 02KF006

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I215.0

MISSISSIPPI RIVER AT RAGGED CHUTE - 02KF007

DRAINAGE AREA : 1048.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1920 - 1957

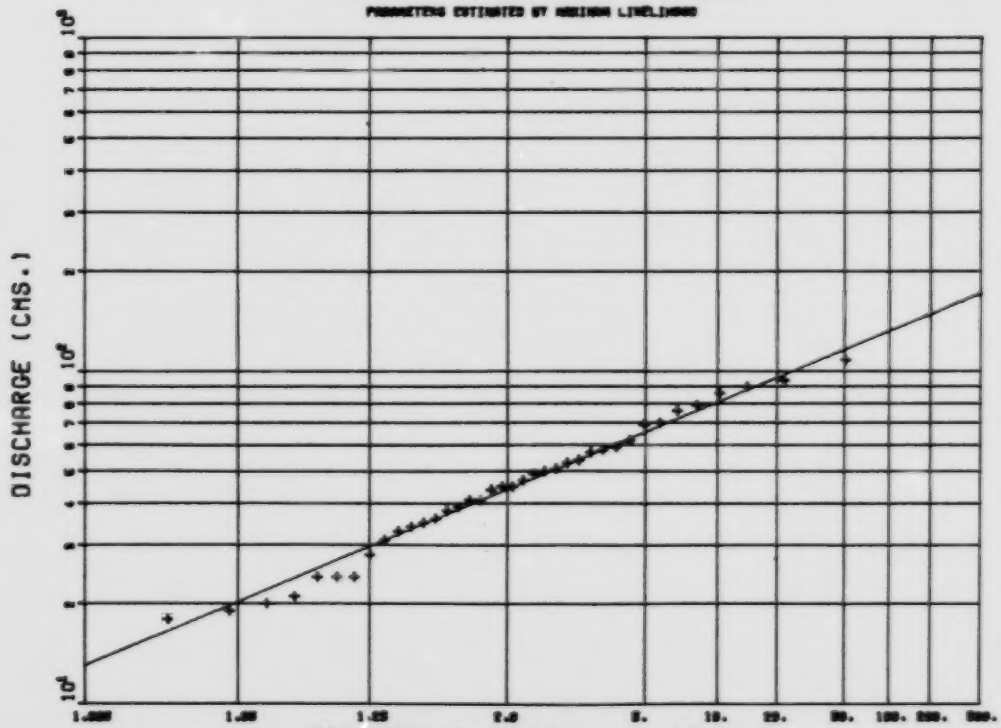
SAMPLE STATISTICS
MEAN = 49. S.D. = 22.6 C.S. = .7890 C.K. = 3.3914
SAMPLE STATISTICS (LOGS)
MEAN = 3.7810 S.D. = .4728 C.S. = -.1303 C.K. = 2.5888
SAMPLE MIN = 18. SAMPLE MAX = 108. N = 38

PARAMETERS FOR GUMBEL I A = .057452 U = 38.
PARAMETERS FOR LOGNORMAL M = 3.7810 S = .4728
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -0. M = 3.7817 S = .4725
STATISTICS OF LOG(X-A)
MEAN = 3.7817 S.D. = .4725 C.S. = -.1297 C.K. = 2.5878
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0388 B = .2357E+03 LOG(M) =11.0398
ME= .6231E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0638 B = .5378E+02
LOG(M)F= 7.2137 M = .1358E+04
DISTRIBUTION STATISTICS MEAN = 3.7810 S.D. = .4681 C.S. = -.2727

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	9.		13.		13.		12.		12.	
1.050	19.		20.		20.		20.		20.	
1.250	30.		30.		30.		30.		30.	
2.000	45.		44.		44.		45.		44.	
2.330	49.	7.38	48.	7.73	48.	8.12	49.	8.07	48.	8.27
5.000	65.	7.88	65.	8.93	65.	8.92	66.	8.22	66.	8.66
10.000	78.	8.41	80.	10.40	80.	10.60	79.	9.15	80.	9.93
20.000	90.	8.86	96.	11.80	96.	12.80	93.	10.80	94.	12.80
50.000	106.	9.33	116.	13.50	116.	15.80	107.	13.80	112.	15.60
100.000	119.	9.63	132.	14.80	132.	18.20	119.	16.42	126.	18.78
200.000	131.	9.88	148.	15.90	148.	20.50	130.	19.20	140.	22.00
500.000	147.	10.10	171.	17.40	171.	23.40	145.	23.00	159.	26.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MISSISSIPPI RIVER AT RAGGED CHUTE - 02KF007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I216.0

MOIRA RIVER NEAR DELORO 02HL005

DRAINAGE AREA : 308.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1982

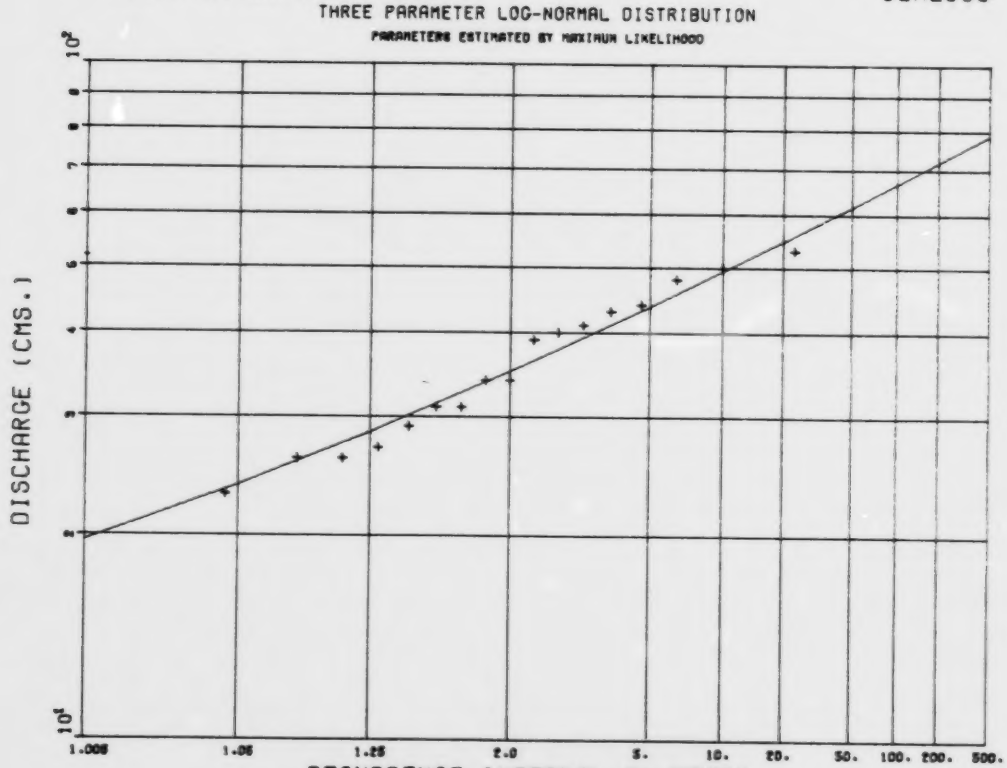
SAMPLE STATISTICS
MEAN = 16. S.D. = 9.2 C.S. = .2990 C.K. = 2.6016
SAMPLE STATISTICS (LOGS)
MEAN = 3.5647 S.D. = .2542 C.S. = -.0292 C.K. = 2.4872
SAMPLE MIN = 23. SAMPLE MAX = 53. N = 17

PARAMETERS FOR GUMBEL I A = .133163 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5647 S = .2542
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 8. M = 3.2771 S = .3384
STATISTICS OF LOG(X-A)
MEAN = 3.2771 S.D. = .3384 C.S. = -.1403 C.K. = 2.5401
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0037 B = .4705E+04 LOG(M) =21.0004
ME= .1319E+10
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0297 B = .6931E+12
LOG(M)= 5.5267 M = .2777E+03
DISTRIBUTION STATISTICS MEAN = 3.5647 S.D. = .2477 C.S. = -.2402

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	20.		18.		27.		18.		14.	
1.050	24.		23.		24.		23.		23.	
1.250	28.		29.		28.		29.		29.	
2.000	35.		35.		35.		36.		35.	
2.330	37.	6.34	37.	6.21	37.	6.73	37.	6.40	37.	6.67
5.000	43.	7.57	44.	7.14	44.	7.70	44.	6.57	44.	7.16
10.000	49.	8.59	49.	8.32	49.	9.43	48.	7.36	49.	8.37
20.000	54.	9.47	54.	9.46	55.	11.60	52.	8.74	54.	10.20
50.000	61.	10.40	60.	10.90	62.	14.90	57.	11.20	59.	13.30
100.000	67.	11.00	64.	11.90	67.	17.50	60.	13.30	64.	16.00
200.000	72.	11.60	68.	12.80	72.	20.20	63.	15.60	68.	18.80
500.000	79.	12.20	74.	14.00	79.	23.70	67.	18.70	73.	22.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MOIRA RIVER NEAR DELORO 02HL005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I217.0

MOIRA RIVER NEAR FOXBORO 02HL001

DRAINAGE AREA : 2620.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1916 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	214.	64.	.120	3.045
LN X SERIES	5.32	.33	-.822	4.104

X(MIN)= 74. CMS. TOTAL SAMPLE SIZE= 67
X(MAX)= 366. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

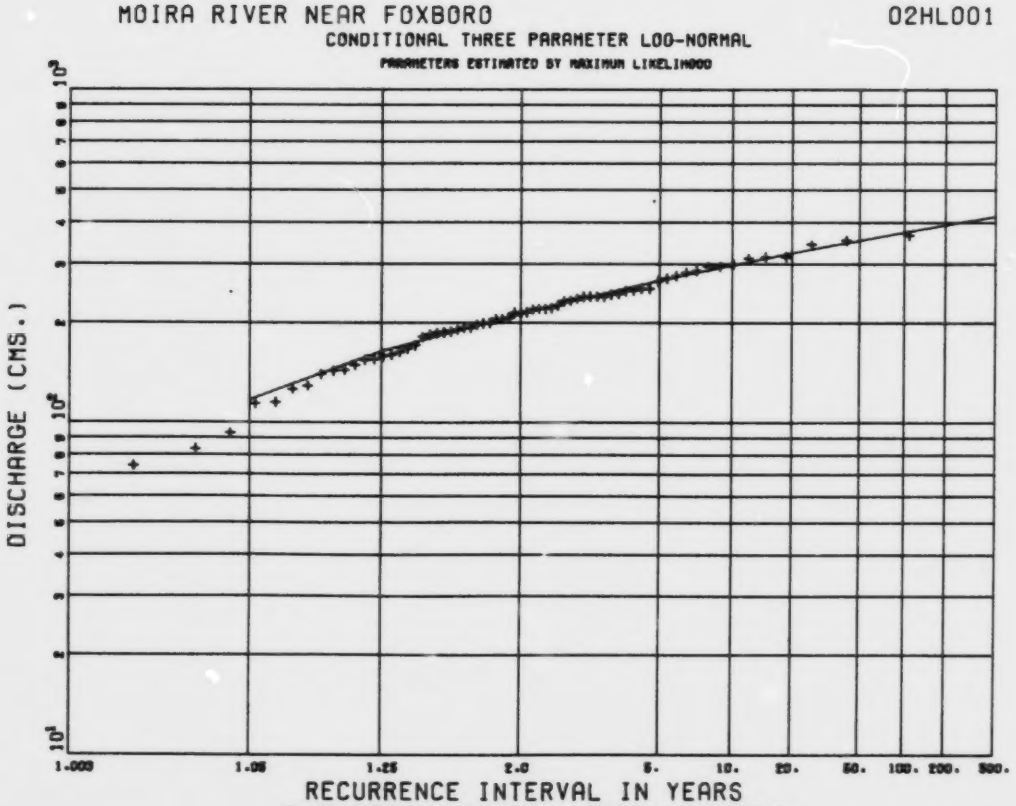
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	216.	62.	.215	3.021
LN X SERIES	5.33	.31	-.632	3.688
LN (X-A) SERIES	6.58	.09	-.038	2.976

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -506.5573 M = 6.5790 S = .0863

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	117.
1.250	.800	164.
2.000	.500	212.
2.330	.429	223.
5.000	.200	267.
10.000	.100	297.
20.000	.050	323.
50.000	.020	352.
100.000	.010	373.
200.000	.005	392.
500.000	.002	416.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I218.0

MONTREAL RIVER NEAR MONTREAL RIVER HARBOUR 02BE002

DRAINAGE AREA : 2880.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1932 - 1942

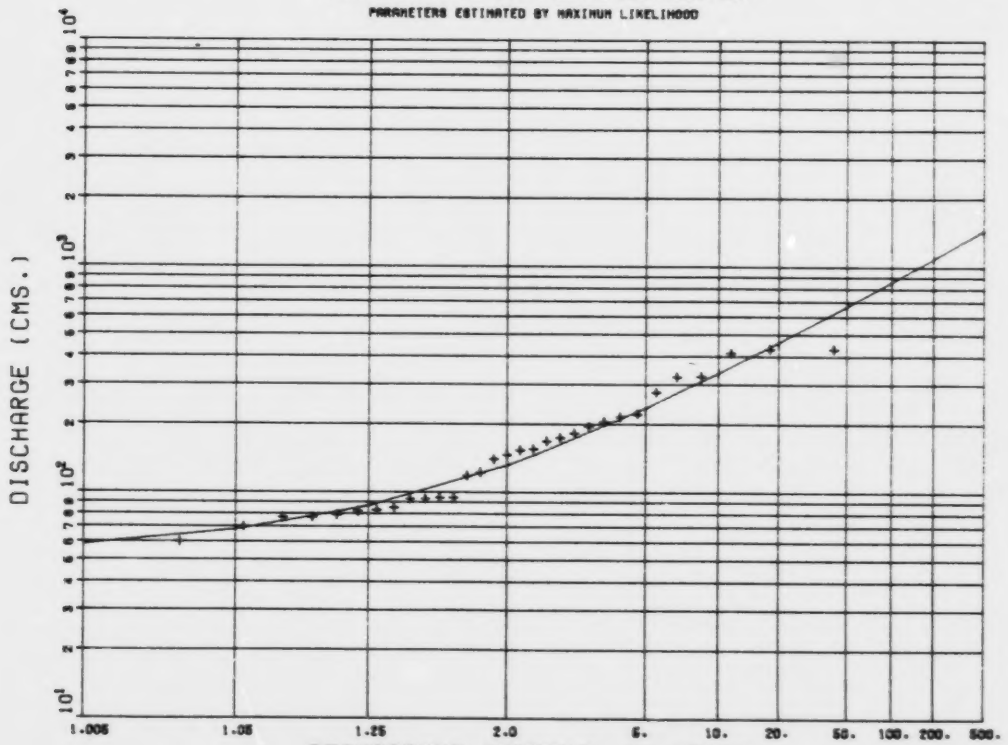
SAMPLE STATISTICS
MEAN = 174. S.D. = 109.9 C.S. = 1.2442 C.K. = 3.3683
SAMPLE STATISTICS (LOGS)
MEAN = 4.9869 S.D. = .5800 C.S. = .4222 C.K. = 2.4521
SAMPLE MIN = 60. SAMPLE MAX = 431. N = 31

PARAMETERS FOR GUMBEL I A = .013990 U = 127.
PARAMETERS FOR LOGNORMAL M = 4.9869 S = .5800
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 52. M = 4.3722 S = .9976
STATISTICS OF LOG(X-A)
MEAN = 4.3722 S.D. = .9976 C.S. = -.2239 C.K. = 2.7311
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1224 B = .2245E+02 LOG(M) = 2.2392
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .9396E+01
A = .3731 B = .2723E+01
LOG(M)= 3.3709 M = .5303E+02
DISTRIBUTION STATISTICS MEAN = 4.9869 S.D. = .6157 C.S. = 1.2120

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	8.		33.		58.		58.		41.	
1.050	48.		56.		64.		68.		61.	
1.250	93.		90.		86.		97.		89.	
2.000	153.		146.		131.		130.		141.	
2.330	168.	9.57	152.	10.50	147.	11.90	144.	11.20	155.	11.60
5.000	234.	9.89	239.	12.10	236.	16.30	229.	16.50	235.	13.50
10.000	284.	10.30	308.	14.10	337.	20.90	333.	22.40	315.	17.10
20.000	339.	10.70	380.	16.00	461.	25.60	473.	29.30	405.	22.30
50.000	406.	11.10	482.	18.43	667.	31.90	740.	38.40	548.	30.00
100.000	456.	11.40	565.	20.10	859.	35.70	1030.	45.90	674.	36.70
200.000	506.	11.60	653.	21.60	1090.	39.60	1420.	53.70	822.	43.80
500.000	571.	11.80	778.	23.60	1451.	44.60	2180.	64.30	1050.	53.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MONTREAL RIVER NEAR MONTREAL RIVER HARBOUR 02BE002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I219.0

MONTREAL RIVER AT UPPER NOTCH GENERATING STATION 02JD008

DRAINAGE AREA : 6480.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1931 - 1970

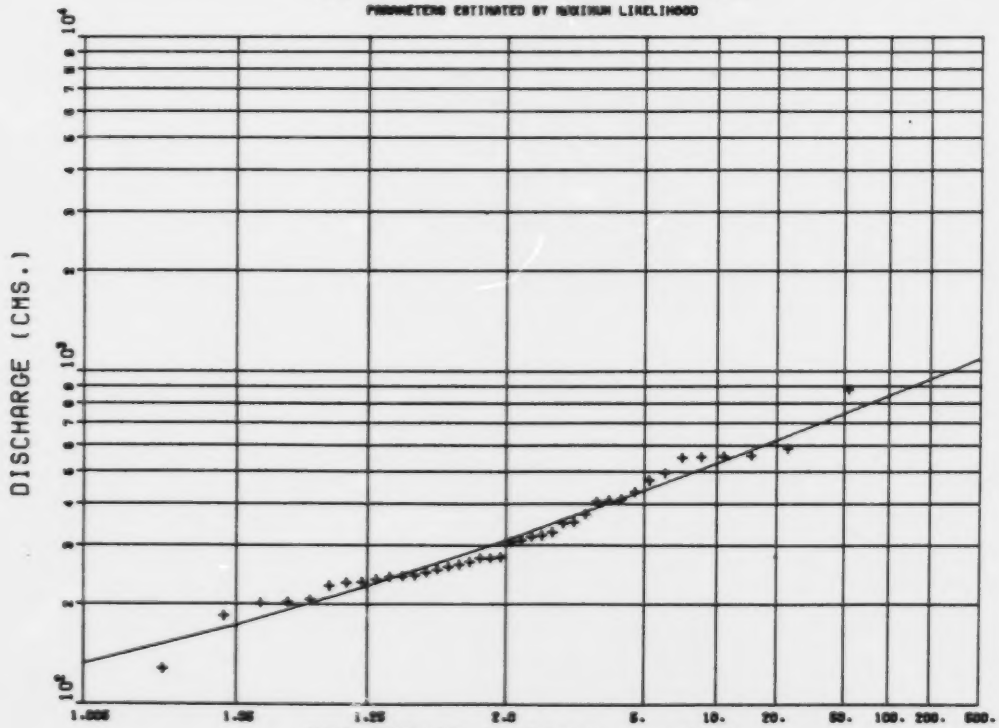
SAMPLE STATISTICS
MEAN = 342. S.D. = 147.7 C.S. = 1.5314 C.K. = 6.3838
SAMPLE STATISTICS (LOGS)
MEAN = 5.7560 S.D. = .3988 C.S. = .4004 C.K. = 3.4168
SAMPLE MIN = 128. SAMPLE MAX = 880. N = 40

PARAMETERS FOR GUMBEL I A = .009981 U = 279.
PARAMETERS FOR LOGNORMAL M = 5.7560 S = .3988
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 62. M = 5.5150 S = .4921
STATISTICS OF LOG(X-A)
MEAN = 5.5150 S.D. = .4921 C.S. = .0667 C.K. = 3.6647
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0782 B = .2495E+02 LOG(M) = 3.8038
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .4487E+02
A = .0686 B = .3157E+02
LOG(M)F= 3.5917 M = .3638E+02
DISTRIBUTION STATISTICS MEAN = 5.7560 S.D. = .3852 C.S. = .3560

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	112.		116.		132.		133.		134.	
1.050	168.		166.		172.		175.		174.	
1.250	232.		227.		226.		227.		226.	
2.000	316.		316.		310.		309.		308.	
2.330	337.	5.96	339.	6.23	331.	6.70	331.	6.62	330.	6.87
5.000	430.	6.64	439.	7.19	438.	7.78	433.	7.77	435.	7.98
10.000	505.	7.25	522.	8.34	529.	9.54	524.	9.68	529.	10.00
20.000	577.	7.76	601.	9.48	620.	11.70	618.	12.20	626.	12.90
50.000	670.	8.31	705.	10.90	744.	14.70	749.	16.20	765.	17.60
100.000	748.	8.65	784.	11.90	842.	17.00	856.	19.50	879.	21.50
200.000	810.	8.94	865.	12.80	944.	19.30	970.	23.00	1000.	25.60
500.000	902.	9.26	974.	14.80	1090.	22.30	1140.	27.80	1180.	31.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MONTREAL RIVER AT UPPER NOTCH GENERATING STATION 02JD008
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I220.0

MONTREAL RIVER AT LOWER NOTCH GENERATING STATION 02JD010

DRAINAGE AREA : 6600.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

SAMPLE STATISTICS
MEAN = 383. S.D. = 77.9 C.S. = 2.0782 C.K. = 9.1748
SAMPLE STATISTICS (LOGS)
MEAN = 5.9329 S.D. = .1793 C.S. = 1.6672 C.K. = 7.4141
SAMPLE MIN = 319. SAMPLE MAX = 589. N = 11

PARAMETERS FOR GUMBEL I A = .822957 U = 354.
PARAMETERS FOR LOGNORMAL M = 5.9329 S = .1793
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 316. M = 3.5644 S = 1.3111
STATISTICS OF LOG(X-A)
MEAN = 3.5644 S.D. = 1.3111 C.S. = -.4143 C.K. = 4.0550
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1494 B = .1439E+01 LOG(M) = 5.7179
ME= .3843E+03

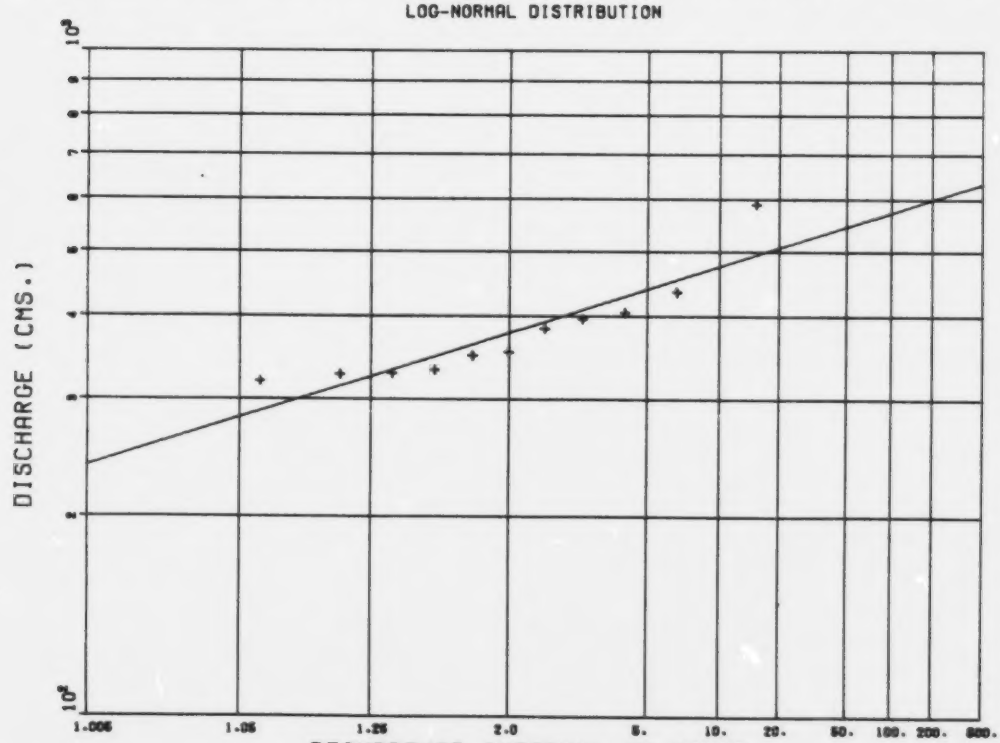
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	281.		238.		317.		0.		305.	
1.050	305.		281.		320.		0.		311.	
1.250	333.		324.		328.		0.		326.	
2.000	370.		377.		351.		0.		360.	
2.330	379.	4.40	389.	5.45	361.	4.97	0.	0.00	371.	7.81
5.000	419.	5.65	439.	6.29	423.	11.60	0.	0.00	424.	9.48
10.000	452.	6.72	475.	7.29	506.	20.70	0.	0.00	477.	12.40
20.000	483.	7.69	507.	8.29	621.	30.60	0.	0.00	535.	18.48
50.000	524.	8.82	545.	9.53	838.	45.30	0.	0.00	623.	29.80
100.000	554.	9.58	572.	10.40	1060.	56.20	0.	0.00	696.	40.10
200.000	584.	10.30	599.	11.20	1350.	66.70	0.	0.00	784.	51.60
500.000	624.	11.10	632.	12.30	1860.	79.50	0.	0.00	914.	68.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MONTREAL RIVER AT LOWER NOTCH GENERATING STATION 02JD010

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I221.0

MONTREAL RIVER AT ELK LAKE 02JD004

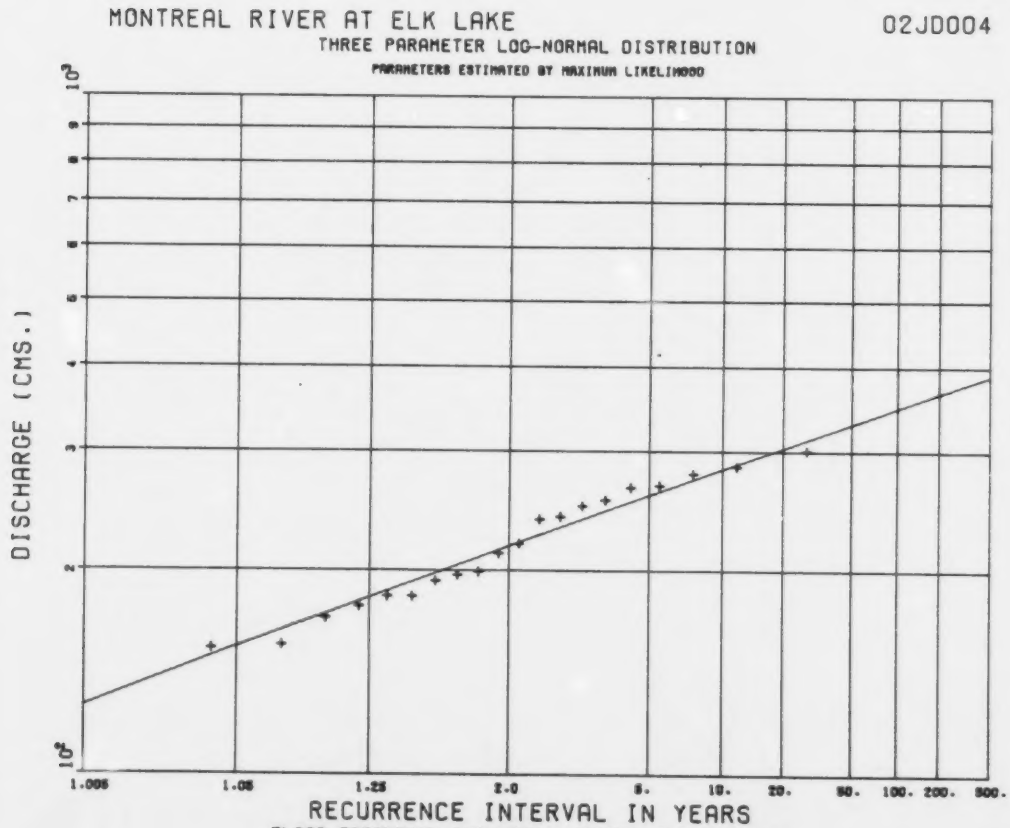
DRAINAGE AREA : 4120.0 SQ. KM.
---REGULATED---
PERIOD OF RECORD : 1938 - 1957

SAMPLE STATISTICS
MEAN = 221. S.D. = 45.1 C.S. = .1571 C.K. = 2.3538
SAMPLE STATISTICS (LOGS)
MEAN = 5.3776 S.D. = .2069 C.S. = -.1021 C.K. = 2.3711
SAMPLE MIN = 153. SAMPLE MAX = 301. N = 20

PARAMETERS FOR GUMBEL I A = .026112 U = 199.
PARAMETERS FOR LOGNORMAL M = 5.3776 S = .2069
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -20. M = 5.4662 S = .1894
STATISTICS OF LOG(X-A)
MEAN = 5.4662 S.D. = .1894 C.S. = -.0796 C.K. = 2.3594
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0106 B = .3434E+03 LOG(M) = 9.4298
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1245E+05
A = -.0318 B = .5651E+01
LOG(M)F= 5.3217 M = .3731E+03
DISTRIBUTION STATISTICS MEAN = 5.3776 S.D. = .2110 C.S. = -.7755

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	135.		127.		126.		130.		125.	
1.050	157.		154.		154.		147.		153.	
1.250	181.		182.		182.		184.		182.	
2.000	213.		216.		217.		222.		217.	
2.330	222.	4.30	225.	4.66	225.	4.85	230.	4.65	225.	4.99
5.000	257.	6.01	258.	5.39	258.	5.31	259.	4.27	258.	5.27
10.000	286.	6.93	282.	6.25	282.	6.26	277.	4.23	282.	6.07
20.000	313.	7.74	304.	7.10	303.	7.60	291.	4.47	302.	7.36
50.000	349.	8.64	331.	8.16	329.	9.66	305.	5.15	327.	9.56
100.000	376.	9.22	350.	8.91	348.	11.30	314.	5.87	345.	11.50
200.000	402.	9.73	369.	9.62	366.	13.00	321.	6.69	362.	13.50
500.000	437.	10.30	393.	10.50	388.	15.30	329.	7.86	383.	16.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1222.0

MONTREAL RIVER AT INDIAN CHUTE 02JD006

DRAINAGE AREA 3420.0 SQ. KM.
---REGULATED---
PERIOD OF RECORD: 1924 - 1957

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	179.	58.	.363	4.912
LN X SERIES	5.12	.41	-2.277	13.578

X(MIN)= 29. CMS. TOTAL SAMPLE SIZE= 34
X(MAX)= 334. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

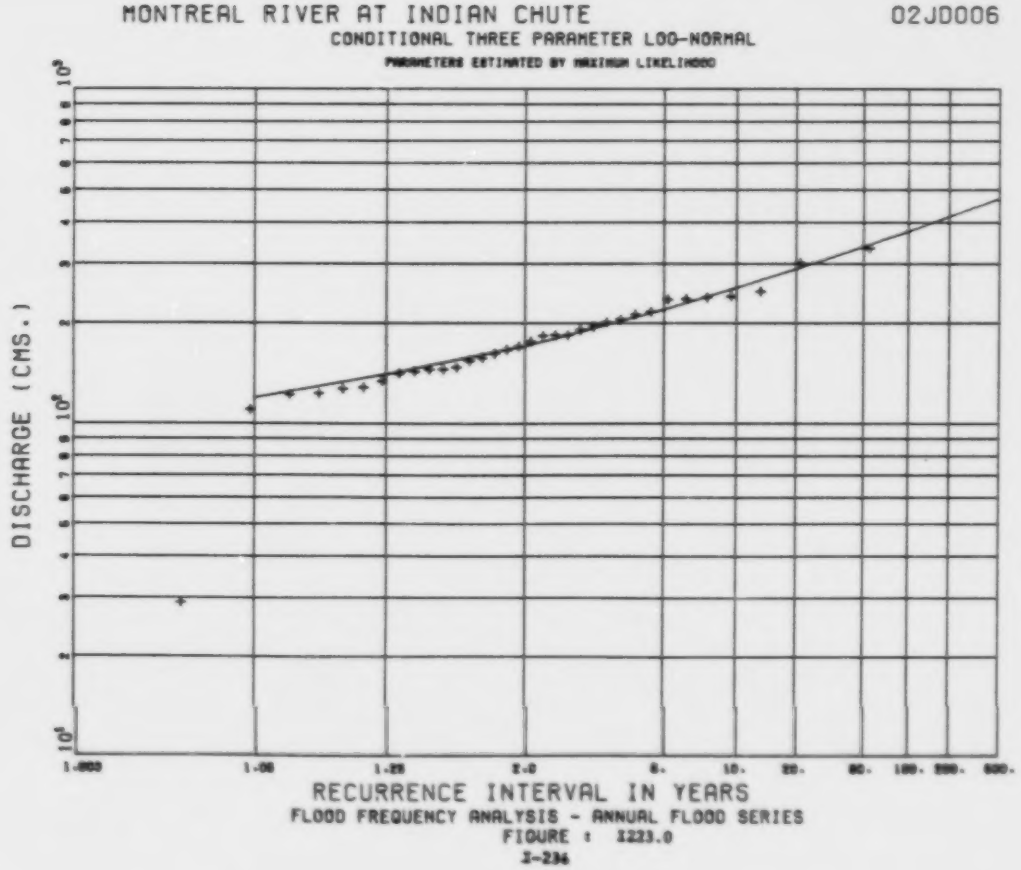
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	183.	59.	1.650	4.543
LN X SERIES	5.16	.27	-.378	3.098
LN (X-A) SERIES	4.53	.50	-.135	2.943

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 78.9685 M = 4.5303 S = .5016

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	119.
1.250	.800	140.
2.000	.500	170.
2.330	.429	179.
5.000	.200	219.
10.000	.100	254.
20.000	.050	289.
50.000	.020	337.
100.000	.010	375.
200.000	.005	415.
500.000	.002	470.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I223.0

MONTREAL RIVER AT INDIAN CHUTE PLANT 02JD005

DRAINAGE AREA : 3420.0 SQ. KM.
---REGULATED---
PERIOD OF RECORD : 1937 - 1957

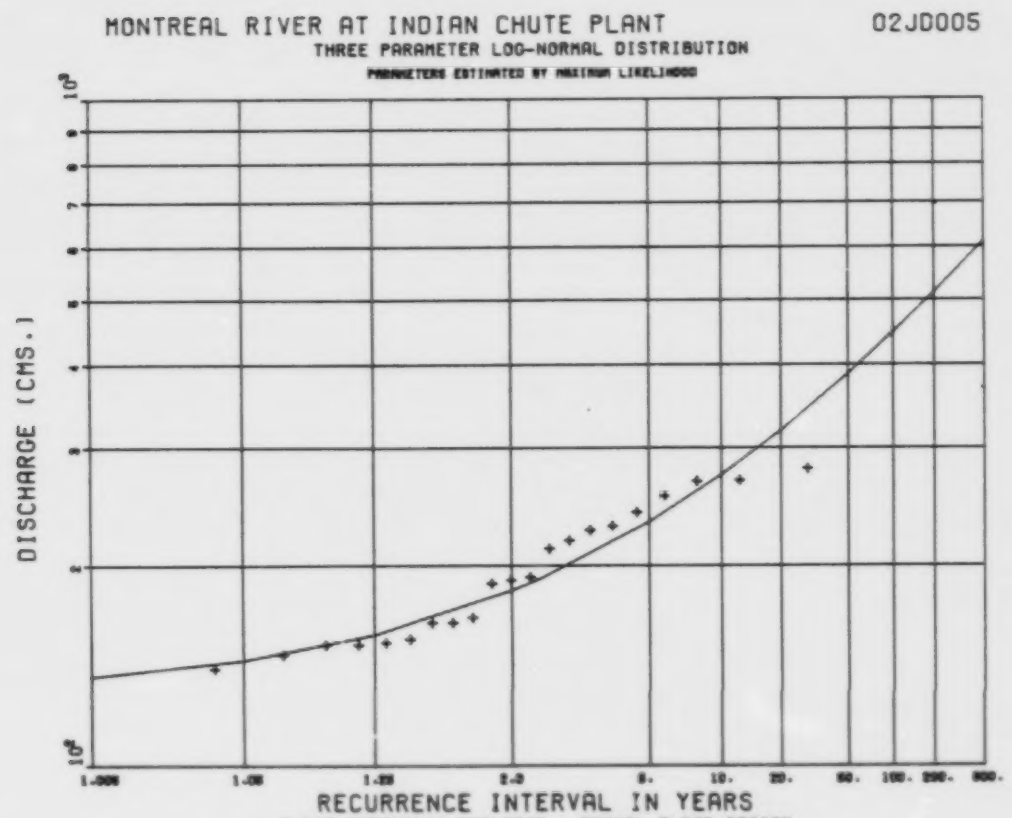
SAMPLE STATISTICS
MEAN = 198. S.D. = 45.3 C.S. = .4273 C.K. = 2.2929
SAMPLE STATISTICS (LOGS)
MEAN = 5.2636 S.D. = .2256 C.S. = .2132 C.K. = 2.0967
SAMPLE MIN = 140. SAMPLE MAX = 279. N = 21

PARAMETERS FOR GUMBEL I A = .028357 U = 177.
PARAMETERS FOR LOGNORMAL M = 5.2636 S = .2256
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 128. M = 4.0149 S = .7517
STATISTICS OF LOG(X-A)
MEAN = 4.0149 S.D. = .7517 C.S. = -.3193 C.K. = 2.3919
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0240 B = .8804E+02 LOG(M) = 3.1468
ME= .2326E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1971 B = .1731E+01
LOG(M)F= 4.9224 M = .1373E+03
DISTRIBUTION STATISTICS MEAN = 5.2636 S.D. = .2593 C.S. = 1.5199

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	118.		108.		136.		138.		113.	
1.050	138.		133.		144.		144.		135.	
1.250	160.		160.		157.		156.		159.	
2.000	190.		193.		183.		182.		192.	
2.330	197.	4.95	201.	4.96	191.	5.67	190.	0.00	200.	5.39
5.000	230.	6.03	234.	5.73	232.	8.60	230.	0.00	233.	6.08
10.000	256.	6.94	258.	6.64	273.	12.10	272.	0.00	259.	7.42
20.000	282.	7.73	280.	7.55	318.	16.10	319.	0.00	284.	9.33
50.000	315.	8.61	307.	8.68	387.	21.70	394.	0.00	315.	12.40
100.000	339.	9.17	326.	9.48	446.	26.00	461.	0.00	338.	15.00
200.000	364.	9.67	345.	10.20	512.	30.30	539.	0.00	361.	17.70
500.000	396.	10.20	370.	11.20	610.	35.90	664.	0.00	392.	21.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MONTREAL RIVER AT INDIAN CHUTE PLANT 02JD005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1224.0

MONTREAL RIVER AT MOUNTAIN CHUTES 02JD009

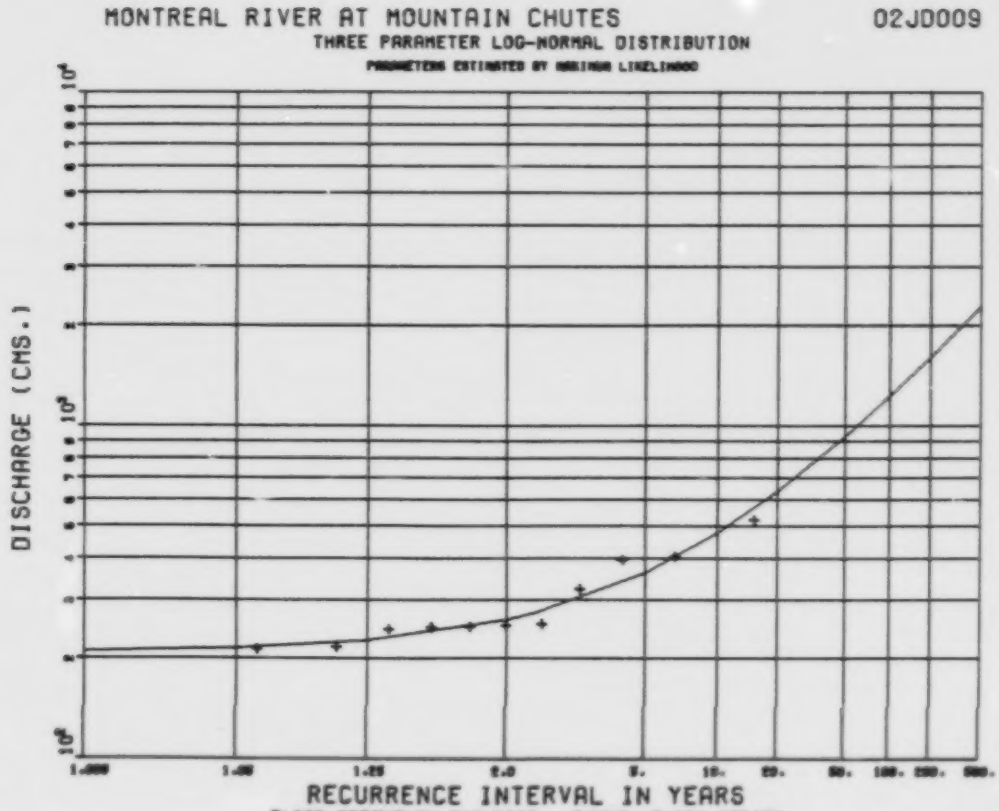
DRAINAGE AREA : 4308.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1969 - 1982

SAMPLE STATISTICS
MEAN = 291. S.D. = 96.8 C.S. = 1.2531 C.K. = 4.8837
SAMPLE STATISTICS (LOGS)
MEAN = 5.6293 S.D. = .2998 C.S. = .7886 C.K. = 3.5575
SAMPLE MIN = 188. SAMPLE MAX = 522. N = 14

PARAMETERS FOR GUMBEL I A = .816080 U = 251.
PARAMETERS FOR LOGNORMAL M = 5.6293 S = .2998
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 171. M = 4.4836 S = .8355
STATISTICS OF LOG(X-A)
MEAN = 4.4836 S.D. = .8355 C.S. = -.1644 C.K. = 3.5923
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1182 B = .6432E+01 LOG(M) = 4.8690
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1302E+03
A = .2317 B = .1941E+01
LOG(P)F= 5.2036 M = .1819E+03
DISTRIBUTION STATISTICS MEAN = 5.6293 S.D. = .3138 C.S. = 1.4742

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	146.		129.		182.		184.		160.	
1.050	181.		178.		194.		194.		183.	
1.250	221.		216.		215.		215.		216.	
2.000	271.		278.		268.		259.		268.	
5.130	307.	7.39	294.	8.88	274.	8.68	272.	8.00	282.	9.37
10.000	344.	8.74	358.	9.32	350.	13.30	346.	8.00	352.	11.30
20.000	391.	9.87	409.	10.80	438.	18.60	422.	8.00	419.	14.90
50.000	436.	10.80	456.	12.30	521.	24.40	511.	8.00	483.	20.20
100.000	495.	11.90	515.	14.10	604.	32.30	596.	8.00	580.	28.90
200.000	538.	12.50	569.	15.40	700.	38.20	700.	8.00	662.	36.30
500.000	582.	13.10	603.	16.60	933.	44.00	952.	8.00	752.	44.20
500.000	639.	13.80	660.	18.20	1150.	51.30	1220.	8.00	886.	55.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1225.0

MOON RIVER AT HIGHWAY NO.69 02EB011

DRAINAGE AREA = uncertain
---REGULATED---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 148. S.D. = 43.5 C.S. = -.0341 C.K. = 2.7871
SAMPLE STATISTICS (LOGS)
MEAN = 5.0073 S.D. = .2436 C.S. = -.4573 C.K. = 3.1734
SAMPLE MIN = 113. SAMPLE MAX = 254. N = 17

PARAMETERS FOR GUMBEL I A = .025431 U = 166.
PARAMETERS FOR LOGNORMAL M = 5.0073 S = .2436

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0857 B = .1912E+02 LOG(M) = 6.2726
ME= .5300E+03

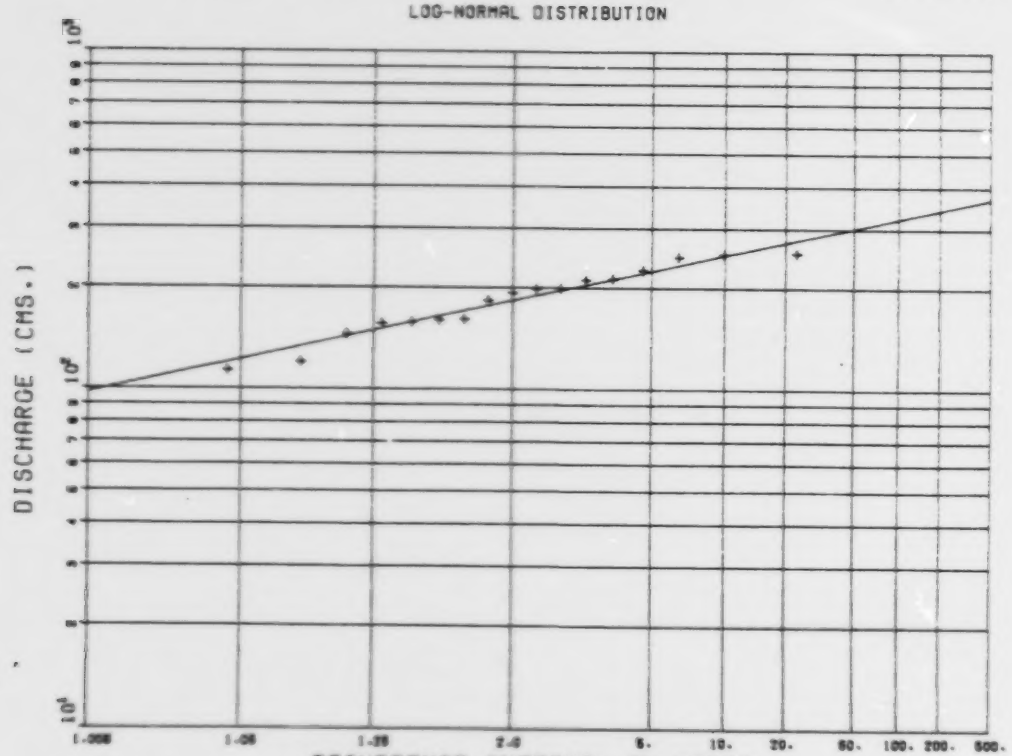
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	121.		98.		0.		0.		85.	
1.050	123.		122.		0.		0.		119.	
1.250	148.		149.		0.		0.		154.	
2.000	181.		183.		0.		0.		186.	
5.000	199.	5.40	191.	5.95	0.	0.00	0.	0.00	194.	6.35
10.000	225.	7.61	224.	6.88	0.	0.00	0.	0.00	225.	6.34
20.000	255.	8.65	258.	7.35	0.	0.00	0.	0.00	246.	6.53
50.000	292.	9.53	303.	9.06	0.	0.00	0.	0.00	264.	7.83
100.000	320.	10.58	341.	10.48	0.	0.00	0.	0.00	283.	10.40
200.000	346.	11.13	377.	11.92	0.	0.00	0.	0.00	296.	12.60
500.000	375.	11.68	422.	12.30	0.	0.00	0.	0.00	308.	15.00
500.000	411.	12.28	488.	13.48	0.	0.00	0.	0.00	321.	18.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MOON RIVER AT HIGHWAY NO.69 02EB011

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1226.0

MOOSE RIVER AT MOOSE RIVER 04LG002

DRAINAGE AREA : 60100.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1963 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	5392.	1222.	.483	4.561
LN X SERIES	8.57	.23	-.410	4.917

X(MIN)= 2940. CMS. TOTAL SAMPLE SIZE= 20
X(MAX)= 8330. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	5524.	1106.	.862	4.633
LN X SERIES	8.60	.19	.411	3.649
LN (X-A) SERIES	7.83	.41	-.068	3.583

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 2799.0752 M = 7.8335 S = .4051

FLOOD FREQUENCY REGIME

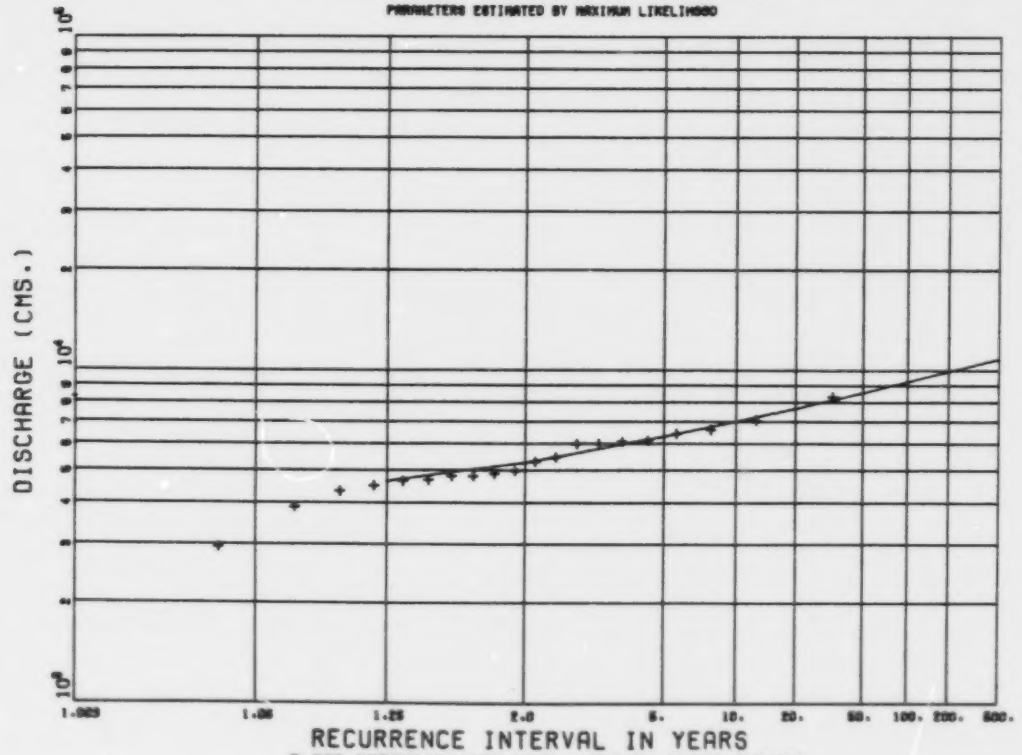
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	4620.
2.000	.500	5260.
2.330	.429	5440.
5.000	.200	6300.
10.000	.100	6990.
20.000	.050	7660.
50.000	.020	8550.
100.000	.010	9230.
200.000	.005	9910.
500.000	.002	10800.

MOOSE RIVER AT MOOSE RIVER 04LG002

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : IZZ7.0

MOUNT PLEASANT CREEK NEAR BURTCH 02GB011

DRAINAGE AREA = 29.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1964 - 1976

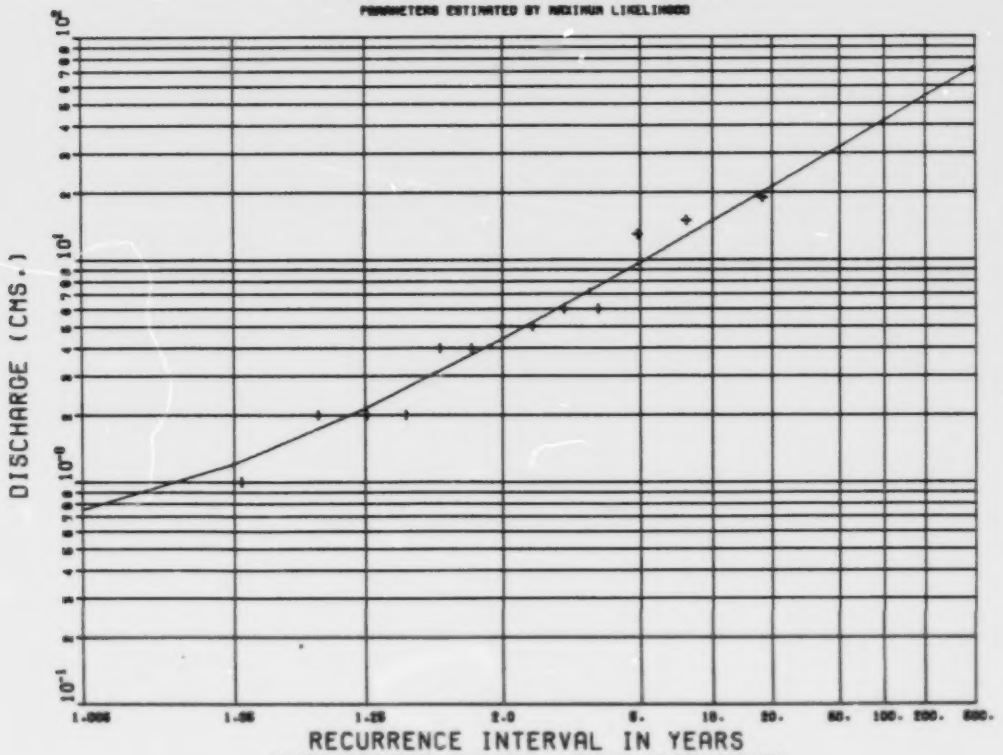
SAMPLE STATISTICS
MEAN = 7. S.D. = 5.6 C.S. = 1.2302 C.K. = 4.4565
SAMPLE STATISTICS (LOGS)
MEAN = 1.5507 S.D. = .8813 C.S. = -.8241 C.K. = 3.2259
SAMPLE MIN = 1. SAMPLE MAX = 19. N = 13

PARAMETERS FOR GUMBEL I A = .277846 U = 4.
PARAMETERS FOR LOGNORMAL M = 1.5507 S = .8813
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 0. M = 1.3994 S = 1.3182
STATISTICS OF LOG(X-A)
MEAN = 1.3094 S.D. = 1.0182 C.S. = -.2848 C.K. = 3.5565
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0106 B = .6885E+04 LOG(P) =74.6745
ME= .2696E+33
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0275 B = .9496E+03
LOG(P)F=27.6492 M = .1618E+13
DISTRIBUTION STATISTICS MEAN = 1.5507 S.D. = .8469 C.S. = -.0649

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-2.		0.		1.		1.		0.	
1.050	0.		1.		1.		1.		1.	
1.250	3.		2.		2.		2.		2.	
2.000	6.		5.		4.		5.		5.	
2.330	6.	20.00	6.	24.60	5.	26.60	6.	25.30	6.	26.40
5.000	10.	18.50	10.	28.40	10.	31.50	10.	27.00	10.	28.40
10.000	12.	18.70	15.	33.00	15.	37.20	14.	31.40	15.	33.20
20.000	15.	18.90	20.	37.50	22.	44.50	19.	38.10	21.	40.60
50.000	18.	19.20	29.	43.10	33.	53.00	26.	49.60	29.	53.00
100.000	21.	19.40	37.	47.00	44.	59.10	33.	59.30	36.	63.40
200.000	24.	19.60	46.	50.80	56.	64.90	40.	69.70	45.	74.60
500.000	27.	19.80	60.	55.50	77.	72.10	51.	84.10	58.	90.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MOUNT PLEASANT CREEK NEAR BURTCH 02GB011
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I220.0

MUSKOKA RIVER AT HIGHWAY NO.69 02EB012

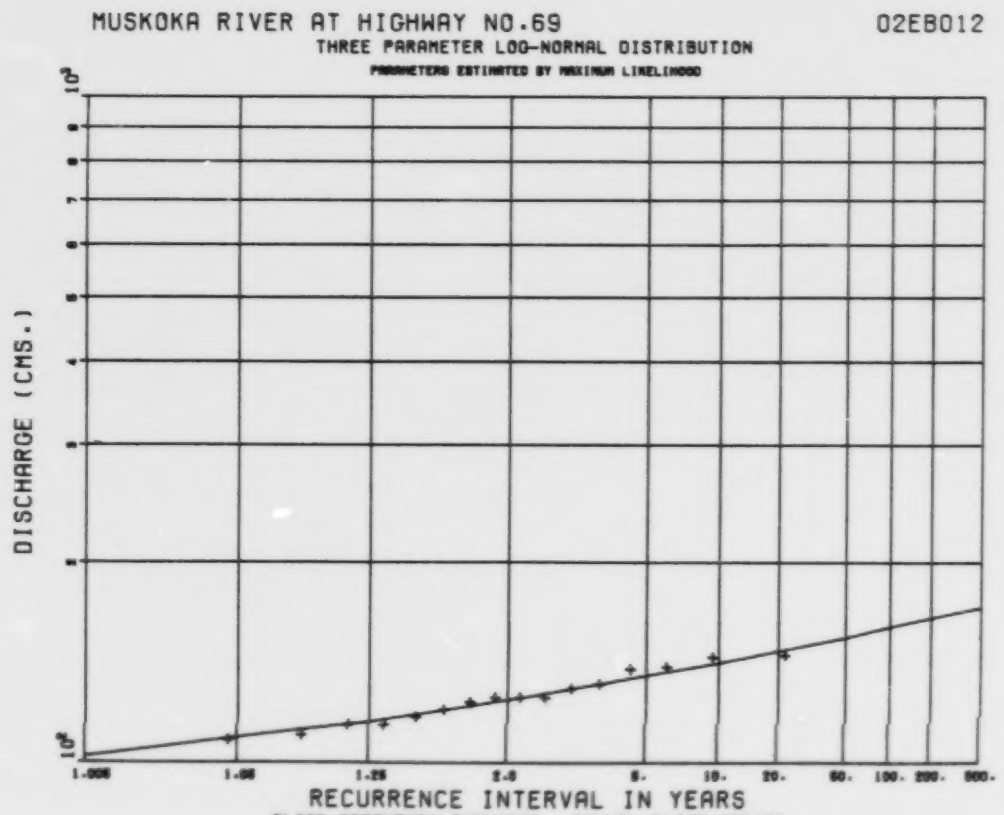
DRAINAGE AREA = 324.0 SQ. KM. (estimate)
---REGULATED---
PERIOD OF RECORD = 1967 - 1982

SAMPLE STATISTICS
MEAN = 125. S.D. = 11.6 C.S. = .2833 C.K. = 2.8156
SAMPLE STATISTICS (LOGS)
MEAN = 4.8278 S.D. = .0921 C.S. = .1417 C.K. = 2.7776
SAMPLE MIN = 108. SAMPLE MAX = 145. N = 16

PARAMETERS FOR GUMBEL I A = .103187 U = 120.
PARAMETERS FOR LOGNORMAL M = 4.8278 S = .0921
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 75. M = 3.8898 S = .2348
STATISTICS OF LOG(X-A)
MEAN = 3.8898 S.D. = .2340 C.S. = -.0833 C.K. = 2.8148
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0065 B = .1992E+03 LOG(M) = 3.5277
ME= .3484E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0722 B = .1533E+02
LOG(M)F= 4.4729 M = .4761E+02
DISTRIBUTION STATISTICS MEAN = 4.8278 S.D. = .0987 C.S. = .5109

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	104.		99.		102.		103.		100.	
1.050	109.		107.		105.		105.		104.	
1.250	115.		116.		115.		116.		116.	
2.000	124.		125.		124.		124.		125.	
2.330	126.	2.45	127.	2.32	126.	2.54	126.	2.45	127.	2.51
5.000	135.	3.25	135.	2.68	135.	3.01	134.	2.99	135.	2.79
10.000	142.	3.95	141.	3.11	141.	3.78	141.	3.81	141.	3.37
20.000	149.	4.61	146.	3.53	147.	4.81	147.	4.65	146.	4.28
50.000	158.	5.40	151.	4.06	154.	6.42	154.	6.44	152.	5.54
100.000	165.	5.95	155.	4.43	160.	7.74	160.	7.75	156.	6.67
200.000	171.	6.46	158.	4.79	165.	9.14	165.	9.13	160.	7.87
500.000	180.	7.09	163.	5.22	171.	11.10	172.	11.00	166.	9.53

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1229.0
I-242

MUSKOKA RIVER BELOW BALA - 02EB006

DRAINAGE AREA : 4770.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1938 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	277.	55.	-.558	3.664
LN X SERIES	5.60	.22	-1.273	5.532

X(MIN)= 128. CMS. TOTAL SAMPLE SIZE= 45
X(MAX)= 378. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	281.	51.	-.324	3.245
LN X SERIES	5.62	.19	-.861	4.143
LN (X-A) SERIES	5.96	.13	-.014	3.099

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 670.2025 M = 5.9568 S = .1302

FLOOD FREQUENCY REGIME

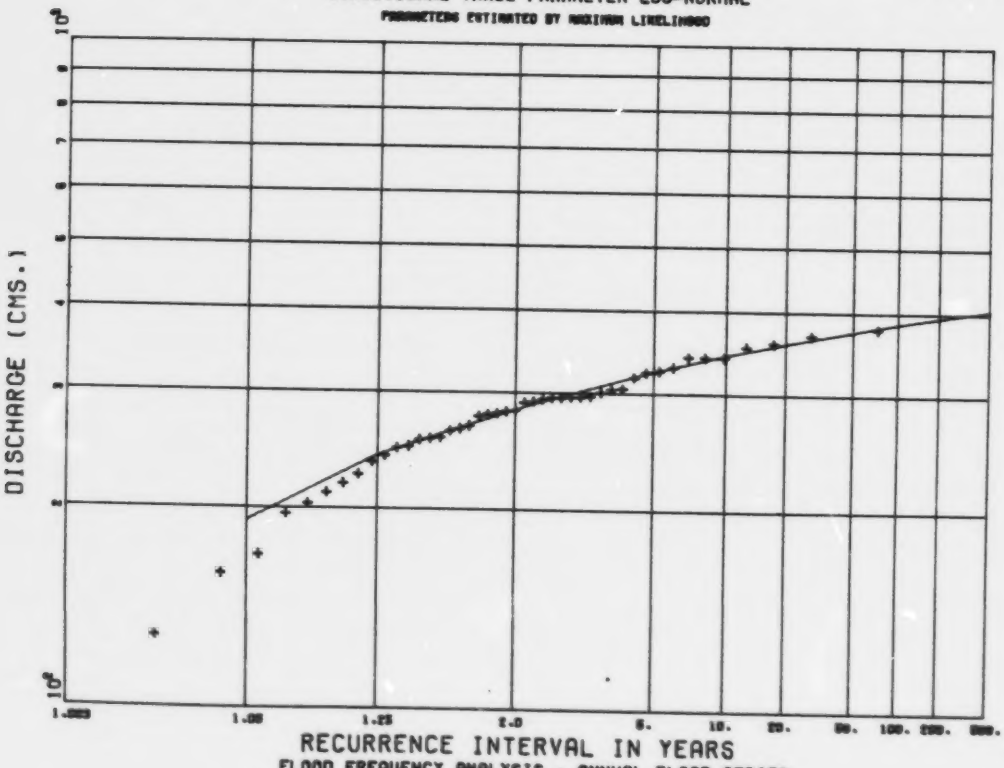
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	191.
1.250	.800	240.
2.000	.500	282.
2.330	.429	291.
5.000	.200	323.
10.000	.100	343.
20.000	.050	358.
50.000	.020	374.
100.000	.010	385.
200.000	.005	394.
500.000	.002	404.

MUSKOKA RIVER BELOW BALA - 02EB006

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : 4230.0

MUSKOKA RIVER NEAR BALA - 02EB005

DRAINAGE AREA : 4840.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1924 - 1937

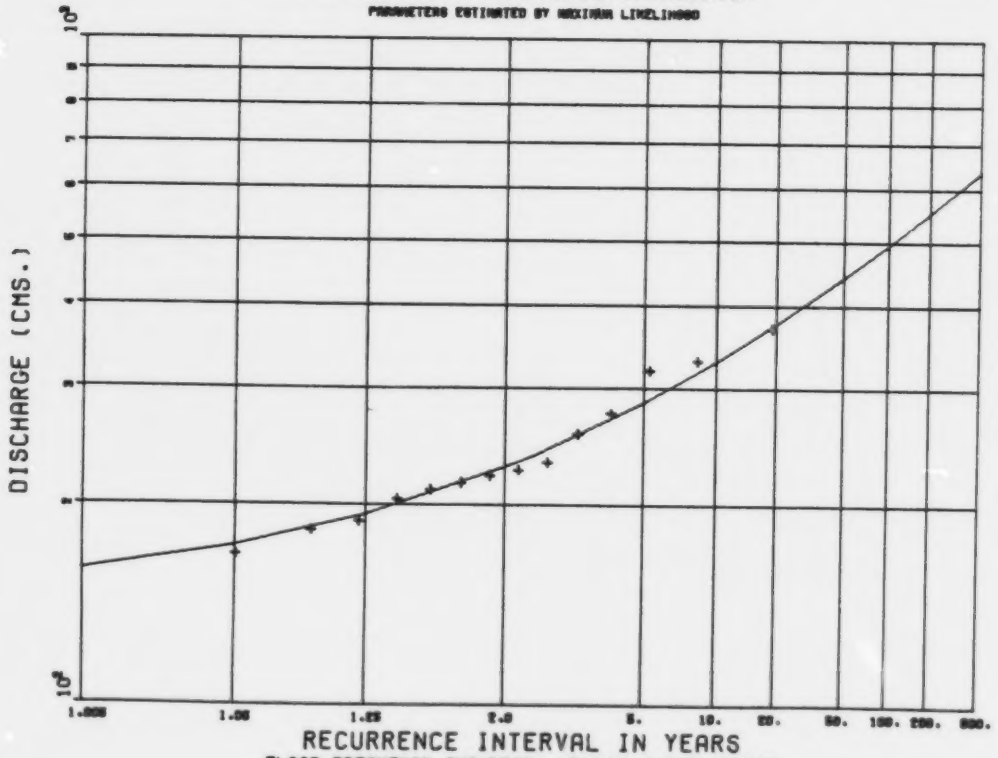
SAMPLE STATISTICS
MEAN = 243. S.D. = 68.1 C.S. = .9407 C.K. = 3.8473
SAMPLE STATISTICS (LOGS)
MEAN = 5.4661 S.D. = .2342 C.S. = .5798 C.K. = 3.3456
SAMPLE MIN = 168. SAMPLE MAX = 370. N = 14

PARAMETERS FOR GUMBEL I A = .023468 U = 217.
PARAMETERS FOR LOGNORMAL M = 5.4661 S = .2342
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 141. M = 4.4597 S = .6051
STATISTICS OF LOG(X-A)
MEAN = 4.4597 S.D. = .6051 C.S. = -.1348 C.K. = 3.5102
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0679 B = .1190E+02 LOG(M) = 4.6583
ME= .1055E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1282 B = .3408E+01
LOG(M)F= 5.0293 M = .1528E+03
DISTRIBUTION STATISTICS MEAN = 5.4661 S.D. = .2366 C.S. = 1.0834

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	146.		129.		159.		162.		147.	
1.050	169.		161.		173.		174.		168.	
1.250	196.		194.		193.		194.		194.	
2.000	232.		237.		228.		227.		231.	
2.330	241.	5.99	247.	6.31	237.	6.89	236.	6.51	241.	7.19
5.000	281.	7.31	288.	7.28	285.	9.51	282.	9.24	285.	8.41
10.000	313.	8.42	319.	8.45	329.	12.80	324.	12.50	323.	10.80
20.000	343.	9.38	348.	9.60	375.	16.70	370.	16.10	360.	14.30
50.000	383.	10.50	383.	11.00	441.	22.20	435.	21.40	410.	19.90
100.000	413.	11.20	408.	12.00	494.	26.50	491.	25.60	450.	24.60
200.000	442.	11.80	432.	13.00	552.	30.90	552.	30.00	491.	29.60
500.000	481.	12.50	464.	14.20	635.	36.60	643.	36.00	549.	36.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

MUSKOKA RIVER NEAR BALA - 02EB005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I231.0

MUSKRAT RIVER NEAR PEMBROKE 02KC015

DRAINAGE AREA : 668.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1969 - 1978

SAMPLE STATISTICS
MEAN = 45. S.D. = 10.2 C.S. = -.6717 C.K. = 3.2248
SAMPLE STATISTICS (LOGS)
MEAN = 3.7873 S.D. = .2486 C.S. = -.9221 C.K. = 4.0441
SAMPLE MIN = 27. SAMPLE MAX = 57. N = 10

PARAMETERS FOR GUMBEL I A = .101773 U = 40.
PARAMETERS FOR LOGNORMAL M = 3.7873 S = .2486

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1146 B = .4705E+01 LOG(M) = 4.3264
ME= .7567E+02

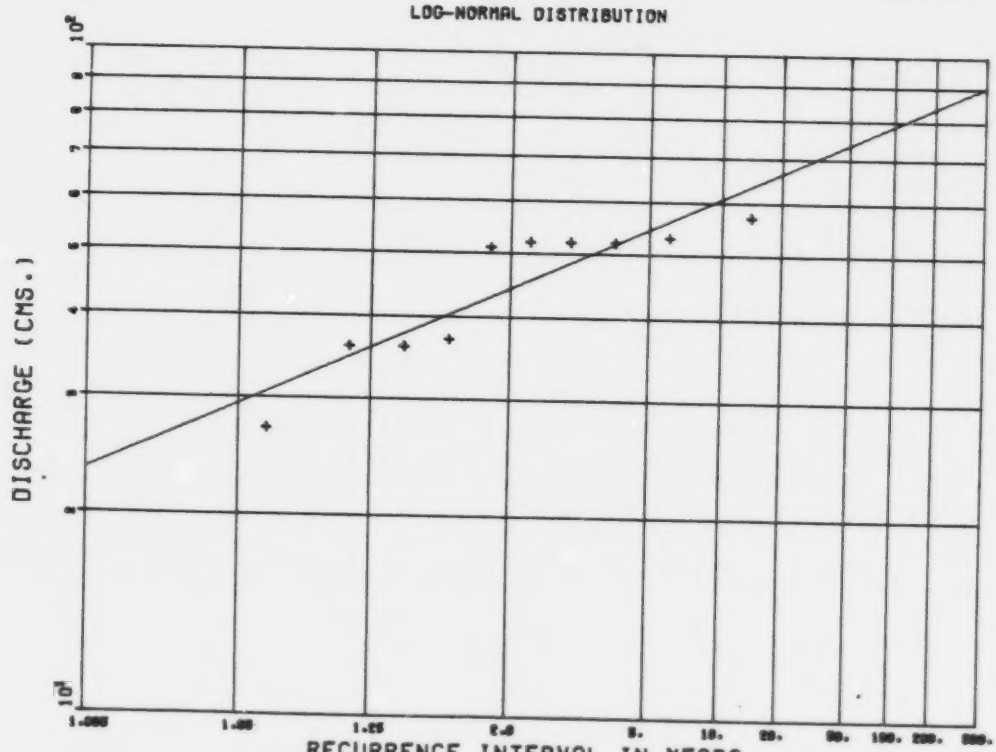
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	24.		23.		0.		0.		19.	
1.050	29.		29.		0.		0.		28.	
1.250	36.		36.		0.		0.		37.	
2.000	44.		44.		0.		0.		46.	
2.330	46.	8.59	46.	7.92	0.	0.00	0.	0.00	48.	8.59
5.000	55.	10.20	54.	9.15	0.	0.00	0.	0.00	55.	6.76
10.000	62.	11.50	61.	10.60	0.	0.00	0.	0.00	59.	7.17
20.000	69.	12.70	68.	12.10	0.	0.00	0.	0.00	62.	9.68
50.000	79.	13.90	76.	13.90	0.	0.00	0.	0.00	65.	14.30
100.000	85.	14.70	79.	15.10	0.	0.00	0.	0.00	67.	17.90
200.000	92.	15.40	84.	16.30	0.	0.00	0.	0.00	68.	21.60
500.000	101.	16.20	90.	17.80	0.	0.00	0.	0.00	70.	26.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

MUSKRAT RIVER NEAR PEMBROKE 02KC015

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1232.0
3-345

NAGAGAMI RIVER AT HIGHWAY NO. 11 04JC002

DRAINAGE AREA = 2410.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1951 - 1982

SAMPLE STATISTICS
MEAN = 123. S.D. = 33.1 C.S. = .4834 C.K. = 2.6867
SAMPLE STATISTICS (LOGS)
MEAN = 4.7793 S.D. = .2679 C.S. = .0814 C.K. = 2.6853
SAMPLE MIN = 68. SAMPLE MAX = 199. N = 32

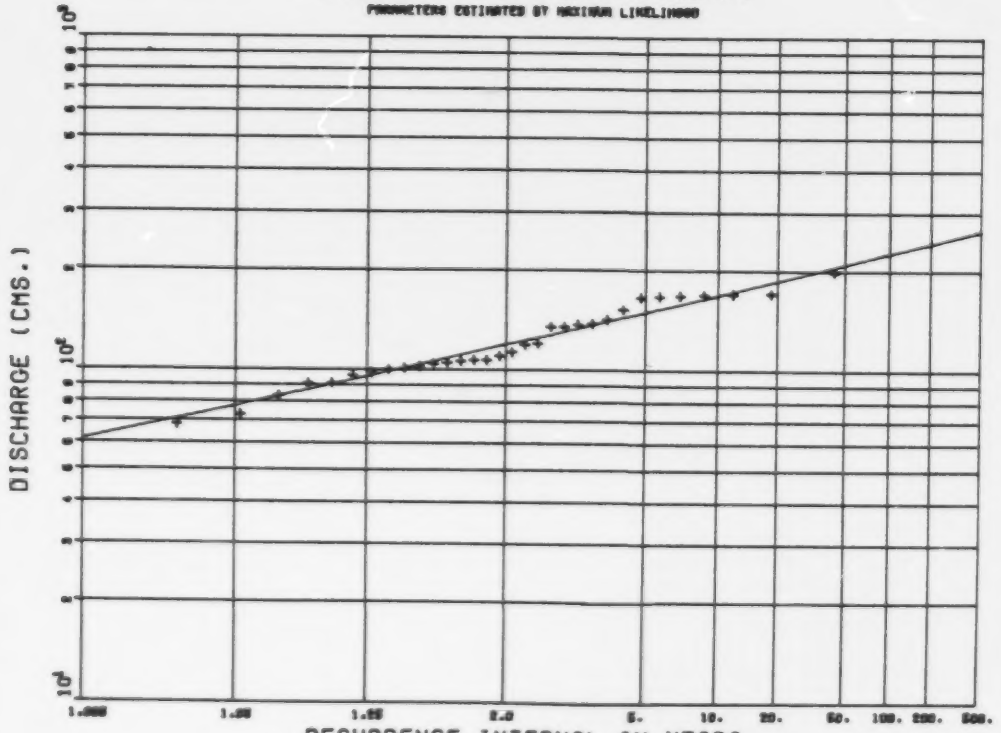
PARAMETERS FOR GUMBEL I A = .036972 U = 108.
PARAMETERS FOR LOGNORMAL M = 4.7793 S = .2679
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 12. M = 4.6695 S = .2988
STATISTICS OF LOG(X-A)
MEAN = 4.6695 S.D. = .2988 C.S. = -.0643 C.K. = 2.7502
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .6002 B = .1942E+07 LOG(M) =*******
ME= .9256-160

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	63.		60.		61.		0.		63.	
1.050	78.		77.		77.		0.		77.	
1.250	95.		95.		95.		0.		95.	
2.000	118.		119.		119.		0.		119.	
2.330	123.	4.91	125.	4.77	124.	5.11	0.	0.00	125.	5.13
5.000	148.	5.81	149.	5.51	149.	5.66	0.	0.00	149.	5.54
10.000	169.	6.55	168.	6.39	168.	6.80	0.	0.00	168.	6.52
20.000	188.	7.19	185.	7.26	186.	8.31	0.	0.00	185.	7.98
50.000	213.	7.88	206.	8.35	209.	10.60	0.	0.00	206.	10.40
100.000	232.	8.32	222.	9.12	226.	12.30	0.	0.00	223.	12.50
200.000	251.	8.78	237.	9.84	242.	14.20	0.	0.00	237.	14.70
500.000	276.	9.14	257.	10.70	264.	16.60	0.	0.00	258.	17.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NAGAGAMI RIVER AT HIGHWAY NO. 11 04JC002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1 I233.0

NAMAKAN RIVER AT OUTLET OF LAC LA CROIX 05PA006

DRAINAGE AREA : 13400.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1923 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	319.	134.	.623	4.781
LN X SERIES	5.67	.48	-.851	4.098

X(MIN)= 63. CMS. TOTAL SAMPLE SIZE= 60
X(MAX)= 800. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	324.	131.	.712	4.968
LN X SERIES	5.69	.44	-.560	3.205
LN (X-A) SERIES	6.40	.21	-.035	3.211

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -289.9359 M = 6.3975 S = .2111

FLOOD FREQUENCY REGIME

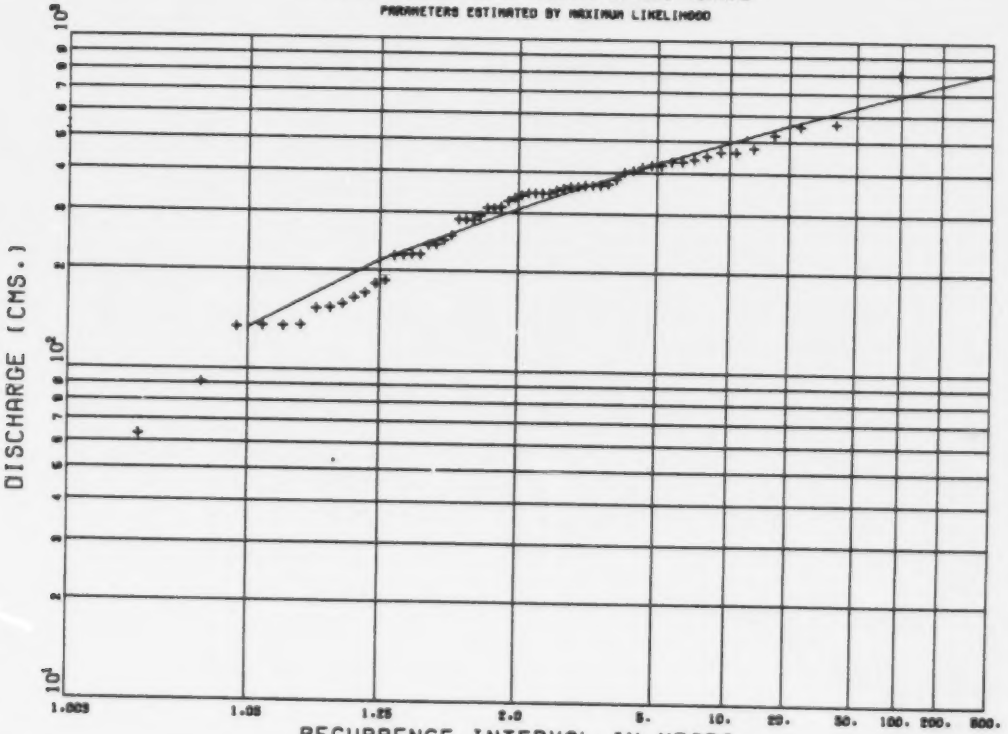
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	133.
1.250	.800	214.
2.000	.500	308.
2.330	.429	331.
5.000	.200	425.
10.000	.100	495.
20.000	.050	558.
50.000	.020	635.
100.000	.010	690.
200.000	.005	743.
500.000	.002	811.

NAMAKAN RIVER AT OUTLET OF LAC LA CROIX 05PA006

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I234.0

NANTICOKE CREEK AT NANTICOKE 02GC022

DRAINAGE AREA : 181.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1972 - 1982

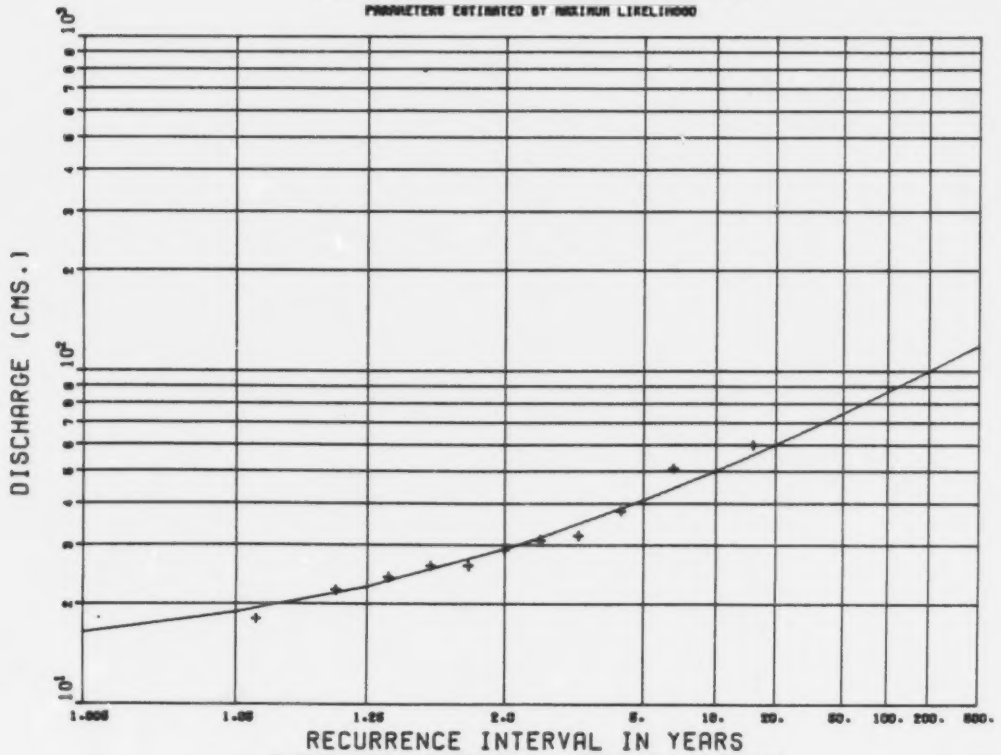
SAMPLE STATISTICS
MEAN = 32. S.D. = 12.7 C.S. = 1.3091 C.K. = 5.2393
SAMPLE STATISTICS (LOGS)
MEAN = 3.4188 S.D. = .3562 C.S. = .6730 C.K. = 4.2602
SAMPLE MIN = 18. SAMPLE MAX = 60. N = 11

PARAMETERS FOR GUMBEL I A = .120460 U = 27.
PARAMETERS FOR LOGNORMAL M = 3.4188 S = .3562
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 14. M = 2.7411 S = .6663
STATISTICS OF LOG(X-A)
MEAN = 2.7411 S.D. = .6663 C.S. = -.0828 C.K. = 4.4269
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1199 B = .8830E+01 LOG(M) = 2.3603
ME= .1059E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1235 B = .5093E+01
LOG(M)= 2.6372 M = .1397E+02
DISTRIBUTION STATISTICS MEAN = 3.4188 S.D. = .3463 C.S. = .8863

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	13.		12.		16.		17.		15.	
1.050	16.		17.		19.		19.		18.	
1.250	23.		23.		22.		23.		23.	
2.000	30.		31.		29.		29.		29.	
2.330	32.	9.93	33.	10.80	31.	11.80	31.	11.00	31.	12.30
5.000	40.	11.40	41.	12.50	41.	15.60	40.	14.80	41.	14.70
10.000	46.	12.60	48.	14.50	50.	20.30	49.	19.60	49.	19.20
20.000	52.	13.70	55.	16.50	60.	25.60	58.	25.30	58.	25.70
50.000	60.	14.80	64.	18.90	75.	32.90	72.	33.60	72.	36.20
100.000	65.	15.50	70.	20.70	87.	38.40	85.	40.30	83.	45.00
200.000	71.	16.10	76.	22.30	100.	43.80	99.	47.40	96.	54.50
500.000	79.	16.70	85.	24.40	119.	50.70	121.	57.00	115.	67.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NANTICOKE CREEK AT NANTICOKE 02GC022
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I235.0

NAPANEE RIVER AT CAMDEN EAST 02HM007

DRAINAGE AREA : 694.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1974 - 1983

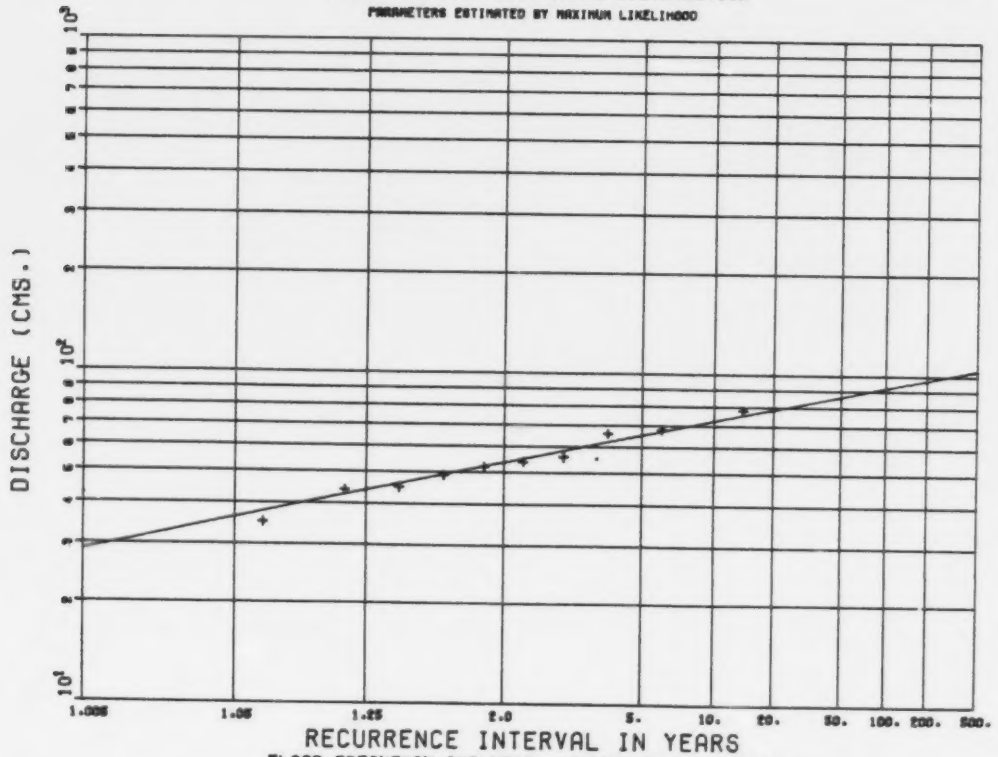
SAMPLE STATISTICS
MEAN = 55. S.D. = 12.8 C.S. = .4228 C.K. = 4.1306
SAMPLE STATISTICS (LOGS)
MEAN = 3.9769 S.D. = .2363 C.S. = -.0936 C.K. = 4.2119
SAMPLE MIN = 35. SAMPLE MAX = 78. N = 10

PARAMETERS FOR GUMBEL I A = .094769 U = 49.
PARAMETERS FOR LOGNORMAL M = 3.9769 S = .2363
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -4. M = 4.0565 S = .2182
STATISTICS OF LOG(X-A)
MEAN = 4.0565 S.D. = .2182 C.S. = -.0512 C.K. = 4.1760
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0111 B = .4567E+03 LOG(M) = 9.0272
ME= .8326E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0175 B = .1653E+03
LOG(M)= 6.8625 M = .9557E+03
DISTRIBUTION STATISTICS MEAN = 3.9769 S.D. = .2244 C.S. = -.1555

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	31.		29.		29.		29.		28.	
1.050	37.		36.		36.		37.		36.	
1.250	44.		44.		44.		44.		44.	
2.000	53.		53.		54.		54.		54.	
3.330	59.	7.71	56.	7.53	56.	7.99	56.	7.61	56.	8.06
5.000	65.	9.30	65.	8.70	65.	8.58	65.	7.95	65.	8.52
10.000	73.	10.60	72.	10.10	72.	10.10	71.	9.07	72.	9.85
20.000	80.	11.80	79.	11.50	78.	12.30	76.	10.90	78.	11.90
50.000	90.	13.00	87.	13.20	86.	15.50	83.	14.10	86.	15.50
100.000	97.	13.90	92.	14.40	92.	18.20	88.	16.80	91.	18.60
200.000	105.	14.60	98.	15.50	97.	20.90	92.	19.70	96.	21.90
500.000	114.	15.40	105.	17.00	104.	24.40	98.	23.70	103.	26.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NAPANEE RIVER AT CAMDEN EAST 02HM007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1 1236.0

NAPANEE RIVER NEAR NAPANEE 02HM001

DRAINAGE AREA : 777.8 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1952 - 1973

SAMPLE STATISTICS
MEAN = 69. S.D. = 28.9 C.S. = .2954 C.K. = 2.5574
SAMPLE STATISTICS (LOGS)
MEAN = 4.0963 S.D. = .3457 C.S. = -.3217 C.K. = 2.8819
SAMPLE MIN = 30. SAMPLE MAX = 181. N = 22

PARAMETERS FOR GUMBEL I A = .056367 U = 54.
PARAMETERS FOR LOGNORMAL B = 4.0963 S = .3457
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -48. M = 4.6228 S = .2038
STATISTICS OF LOG(X-A)
MEAN = 4.6228 S.D. = .2038 C.S. = -.0663 C.K. = 2.6191
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8556 B = .3866E+02 LOG(P) = 6.2459
ME= .5159E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1940 B = .3538E+01
LOG(P)F= 4.7810 M = .1192E+03
DISTRIBUTION STATISTICS MEAN = 4.0963 S.D. = .3644 C.S. =-1.8644

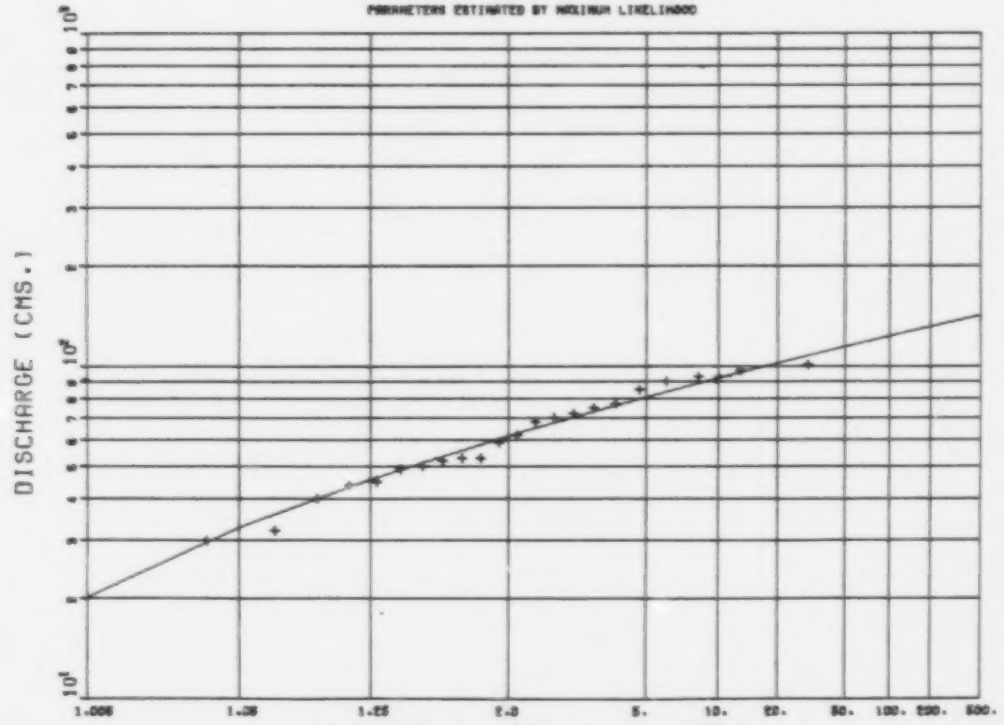
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	24.		25.		28.		16.		22.	
1.050	34.		34.		33.		30.		33.	
1.250	45.		45.		46.		46.		45.	
2.000	66.		68.		62.		64.		61.	
5.000	84.	7.52	84.	7.43	85.	7.52	83.	7.13	85.	7.92
10.000	80.	8.58	80.	8.58	80.	7.57	82.	6.16	81.	7.87
20.000	94.	9.35	94.	9.95	92.	8.61	98.	5.69	92.	8.71
50.000	106.	10.10	106.	11.30	102.	10.20	96.	5.47	103.	10.60
100.000	123.	10.80	122.	13.00	114.	12.20	103.	5.57	115.	13.60
200.000	135.	11.38	134.	14.20	121.	14.50	106.	5.92	124.	16.40
500.000	148.	11.78	146.	15.30	131.	16.40	109.	6.44	132.	19.30
	164.	12.20	163.	16.70	142.	19.00	112.	7.29	142.	23.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NAPANEE RIVER NEAR NAPANEE 02HM001

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



RECURRENCE INTERVAL IN YEARS

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I237.0

NEEBING RIVER NEAR THUNDER BAY 02AB008

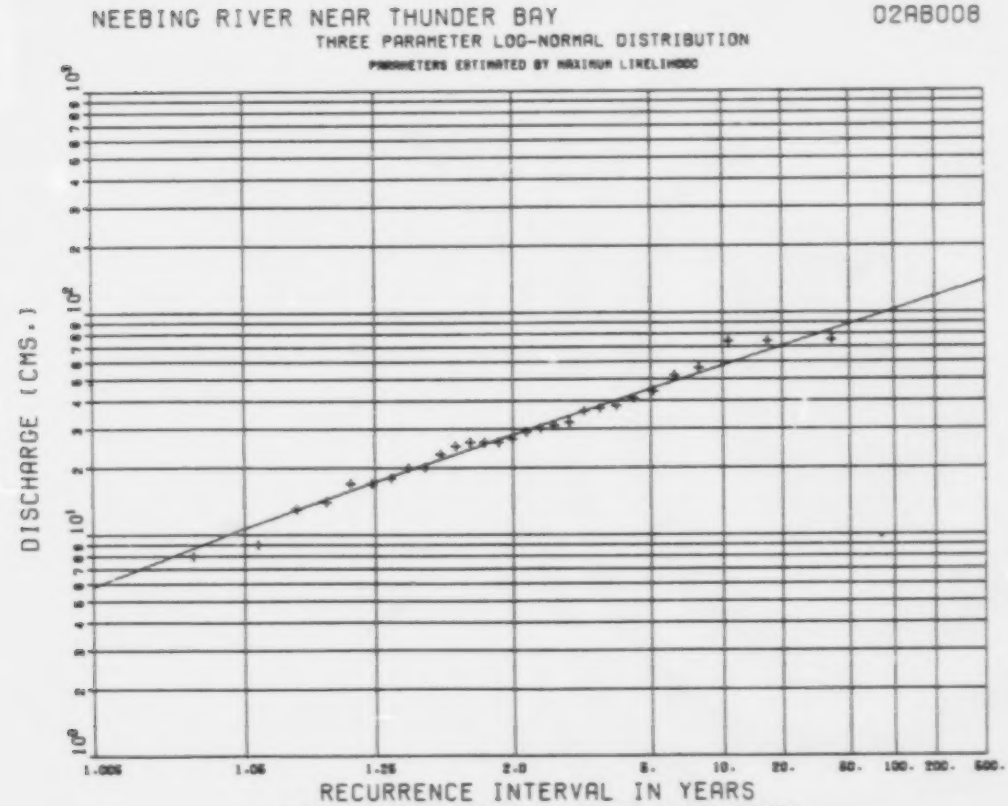
DRAINAGE AREA : 187.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1954 - 1982

SAMPLE STATISTICS
MEAN = 32. S.D. = 18.6 C.S. = 1.1319 C.K. = 4.0736
SAMPLE STATISTICS (LOGS)
MEAN = 3.3225 S.D. = .5749 C.S. = -.1586 C.K. = 3.2576
SAMPLE MIN = 8. SAMPLE MAX = 75. N = 29

PARAMETERS FOR GUMBEL I A = .076899 U = 24.
PARAMETERS FOR LOGNORMAL F = 3.3225 S = .5749
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2. M = 3.3869 S = .5386
STATISTICS OF LOG(X-A)
MEAN = 3.3869 S.D. = .5386 C.S. = -.0644 C.K. = 3.1796
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0456 B = .1591E+03 LOG(M) =10.5731
ME= .3907E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0569 B = .9877E+02
LOG(M)= 8.9416 M = .7644E+04
DISTRIBUTION STATISTICS MEAN = 3.3225 S.D. = .5654 C.S. = -.2012

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.075	2.		6.		6.		6.		6.	
1.053	10.		11.		11.		11.		11.	
1.250	16.		17.		17.		17.		17.	
1.429	23.		28.		28.		28.		28.	
1.538	32.	9.71	31.	10.80	31.	11.10	31.	11.20	31.	11.50
1.667	44.	9.99	45.	12.40	45.	12.10	46.	11.60	45.	12.00
1.818	54.	10.50	58.	14.40	57.	14.20	57.	13.10	57.	13.60
2.000	63.	10.90	71.	16.40	70.	17.80	68.	15.70	70.	16.50
5.000	76.	11.40	98.	18.80	88.	20.80	83.	20.10	86.	21.40
10.000	85.	11.60	106.	20.50	102.	23.70	95.	24.00	99.	25.60
20.000	94.	11.90	122.	22.20	117.	26.50	107.	28.10	112.	30.10
50.000	106.	12.10	145.	24.20	136.	30.20	123.	33.90	130.	36.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I230.0

NIAGARA RIVER AT QUEENSTON (1926-51: NAT) 02HA003

DRAINAGE AREA : 686800.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1926 - 1951

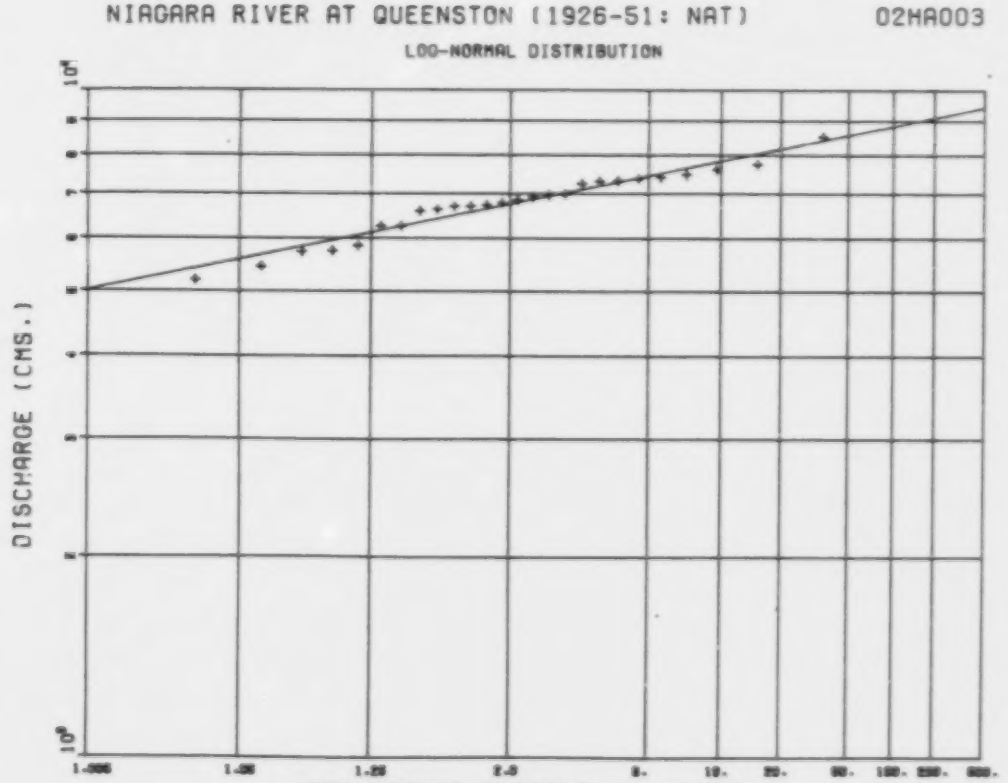
SAMPLE STATISTICS
MEAN = 6779. S.D. = 766.8 C.S. = -.1861 C.K. = 3.5231
SAMPLE STATISTICS (LOGS)
MEAN = 8.8151 S.D. = .1159 C.S. = -.4989 C.K. = 3.5159
SAMPLE MIN = 5192. SAMPLE MAX = 8514. N = 26

PARAMETERS FOR GUMBEL I A = .001328 U = 6396.
PARAMETERS FOR LOGNORMAL M = 8.8153 S = .1159

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0289 B = .1587E+02 LOG(M) = 9.2800
ME= .1872E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0267 B = .1807E+02
LOG(M)F= 9.2976 M = .1891E+05
DISTRIBUTION STATISTICS MEAN = 8.8153 S.D. = .1135 C.S. = -.4755

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	5140.		5000.		0.		4788.		4730.	
1.050	5560.		5570.		0.		5510.		5480.	
1.250	6040.		6110.		0.		6140.		6130.	
2.000	6670.		6740.		0.		6830.		6800.	
2.370	6830.	2.74	6880.	2.29	0.	0.00	6933.	2.31	6940.	2.44
5.000	7530.	3.54	7430.	2.65	0.	0.00	7420.	2.26	7440.	2.29
10.000	8090.	4.22	7820.	3.27	0.	0.00	7740.	2.41	7760.	2.46
20.000	8630.	4.84	8150.	3.49	0.	0.00	7930.	2.74	8010.	2.96
50.000	9330.	5.56	8550.	4.01	0.	0.00	8260.	3.40	8280.	3.95
100.000	9860.	6.05	8820.	4.38	0.	0.00	8430.	4.00	8450.	4.82
200.000	10400.	6.50	9080.	4.72	0.	0.00	8590.	4.65	8610.	5.74
500.000	11100.	7.09	9410.	5.16	0.	0.00	8770.	5.55	8790.	7.01

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I239.0

NIAGARA RIVER AT QUEENSTON (1955-74: REG) 02HA003

DRAINAGE AREA : 686000.0 SQ. KM.
Regulated : unclassified
PERIOD OF RECORD : 1955 - 1974

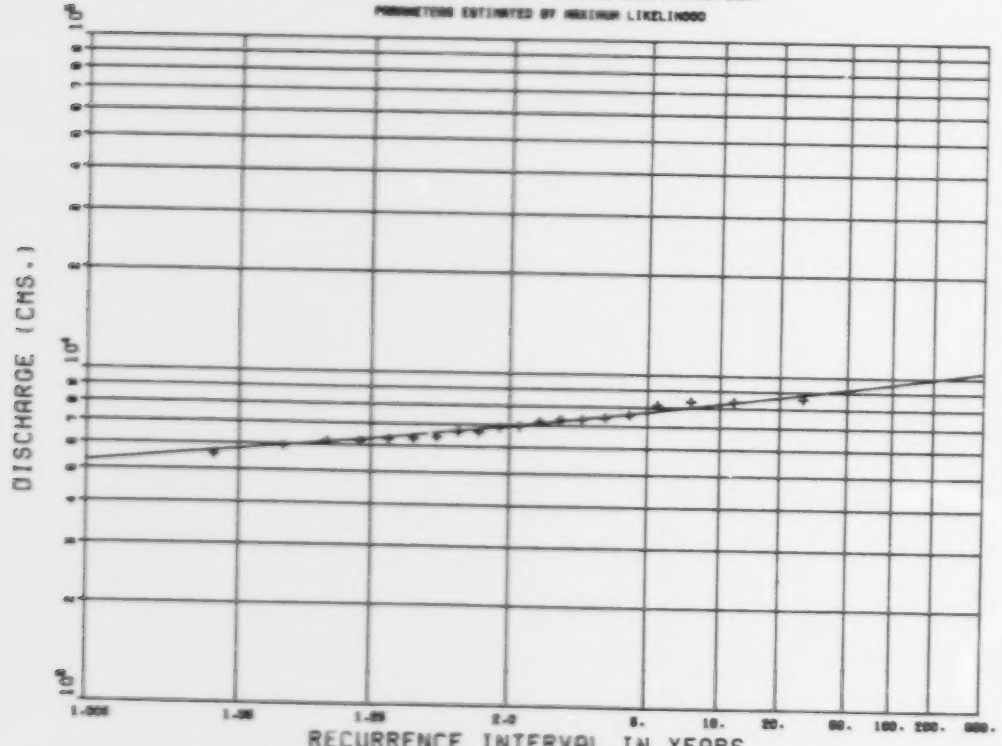
SAMPLE STATISTICS
MEAN = 7022. S.D. = 866.8 C.S. = .3448 C.K. = 2.7683
SAMPLE STATISTICS (LOGS)
MEAN = 8.8497 S.D. = .1225 C.S. = .1390 C.K. = 2.7528
SAMPLE MIN = 5567. SAMPLE MAX = 8588. N = 20

PARAMETERS FOR GUMBEL I A = .001378 U = 6615.
PARAMETERS FOR LOGNORMAL M = 8.8497 S = .1225
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3276. M = 8.2029 S = .2329
STATISTICS OF LOG(X-A)
MEAN = 8.2029 S.D. = .2329 C.S. = -.0641 C.K. = 2.8684
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0085 B = .2072E+03 LOG(M) = 7.0861
ME= .1195E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0193 B = .3623E+02
LOG(M)F= 8.1268 M = .3384E+04
DISTRIBUTION STATISTICS MEAN = 8.8497 S.D. = .1201 C.S. = .3323

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	5400.		5080.		5280.		5310.		5170.	
1.050	5810.		5700.		5770.		5790.		5730.	
1.250	6270.		6290.		6280.		6290.		628[illegible].	
2.000	6890.		6970.		6930.		6930.		6950.	
2.330	7030.	2.93	7130.	2.76	7080.	3.00	7080.	2.92	711[illegible].	2.99
5.000	7700.	3.80	7730.	3.19	7720.	3.49	7690.	3.41	772[illegible].	3.32
10.000	8250.	4.55	8160.	3.76	8200.	4.33	8150.	4.23	817[illegible].	4.00
20.000	8770.	5.23	8530.	4.2[illegible]	8630.	5.44	8590.	5.33	857[illegible].	4.99
50.000	9450.	6.04	9070.	4.93	9170.	7.16	9110.	7.06	905[illegible].	6.58
100.000	9950.	6.59	9270.	5.27	9550.	8.57	9430.	8.50	939[illegible].	7.92
200.000	10500.	7.09	9560.	5.69	9930.	10.00	9860.	10.00	971[illegible].	9.35
500.000	11130.	7.69	9920.	6.22	10400.	12.10	10300.	12.10	1010[illegible].	11.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NIAGARA RIVER AT QUEENSTON (1955-74: REG) 02HA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I239.1

NIPIGON RIVER AT PINE PORTAGE 02AD008

DRAINAGE AREA = 24600.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1941 - 1979

SAMPLE STATISTICS
MEAN = 537. S.D. = 68.1 C.S. = -.0251 C.K. = 2.1482
SAMPLE STATISTICS (LOGS)
MEAN = 6.2774 S.D. = .1284 C.S. = -.1773 C.K. = 2.1166
SAMPLE MIN = 434. SAMPLE MAX = 653. N = 29

PARAMETERS FOR GUMBEL I A = .316546 U = 503.
PARAMETERS FOR LOGNORMAL M = 6.2774 S = .1284

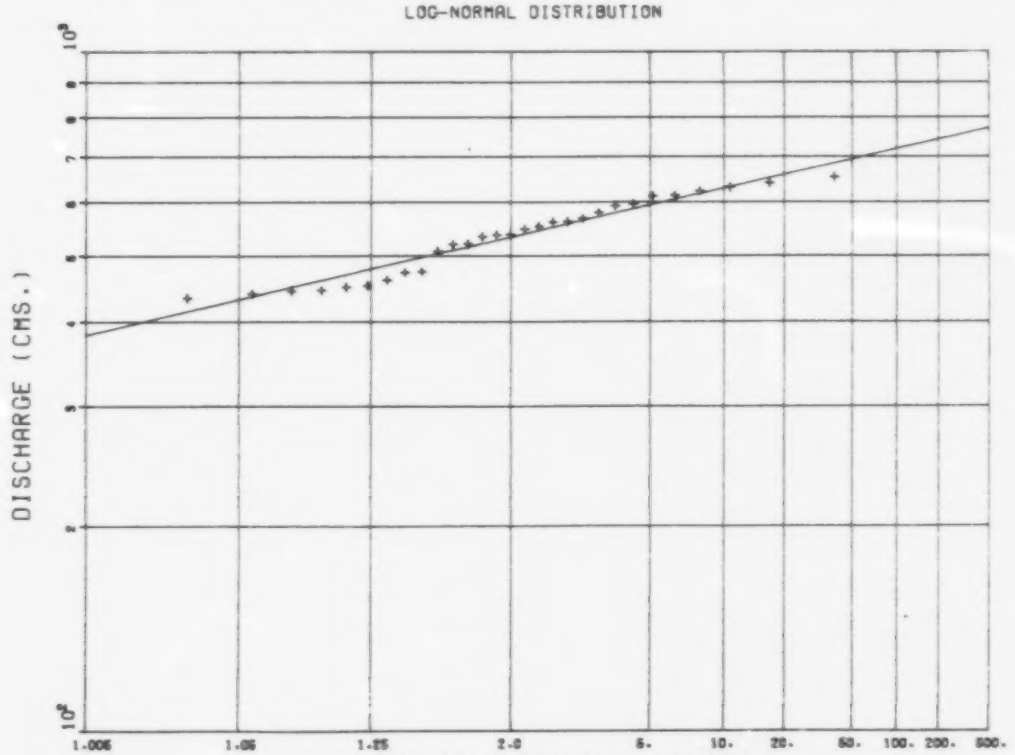
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0114 B = .1272E+03 LOG(M) = 7.7254
ME= .2265E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3645 B = .4385E+01
LOG(M)E= 6.5574 M = .2047E+03
DISTRIBUTION STATISTICS MEAN = 6.2774 S.D. = .1344 C.S. = -.9591

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	402.		382.		0.		334.		334.	
1.050	436.		431.		0.		414.		429.	
1.250	474.		478.		0.		441.		478.	
2.000	525.		532.		0.		544.		534.	
2.330	538.	2.65	545.	2.46	0.	0.00	556.	2.36	547.	2.57
5.000	594.	3.41	593.	2.77	0.	0.00	597.	2.08	594.	2.66
10.000	639.	4.26	628.	3.22	0.	0.00	620.	1.98	626.	3.02
20.000	683.	4.85	658.	3.66	0.	0.00	637.	1.97	653.	3.64
50.000	739.	5.34	693.	4.25	0.	0.00	653.	2.11	685.	4.72
100.000	781.	5.41	718.	4.59	0.	0.00	663.	2.32	706.	5.66
200.000	823.	6.23	741.	4.95	0.	0.00	670.	2.58	725.	6.66
500.000	879.	6.73	771.	5.41	0.	0.00	678.	2.98	750.	8.04

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NIPIGON RIVER AT PINE PORTAGE 02AD008

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1240.0

NIPIGON RIVER BELOW VIRGIN FALLS 02AD006

DRAINAGE AREA : 24500.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1927 - 1943

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	377.	88.	-.156	3.052
LN X SERIES	5.91	.25	-.644	4.139

X(MIN)= 204. CMS. TOTAL SAMPLE SIZE= 17
X(MAX)= 507. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	388.	79.	.102	2.486
LN X SERIES	5.94	.21	-.895	2.472
LN (X-A) SERIES	5.84	.23	-.114	2.478

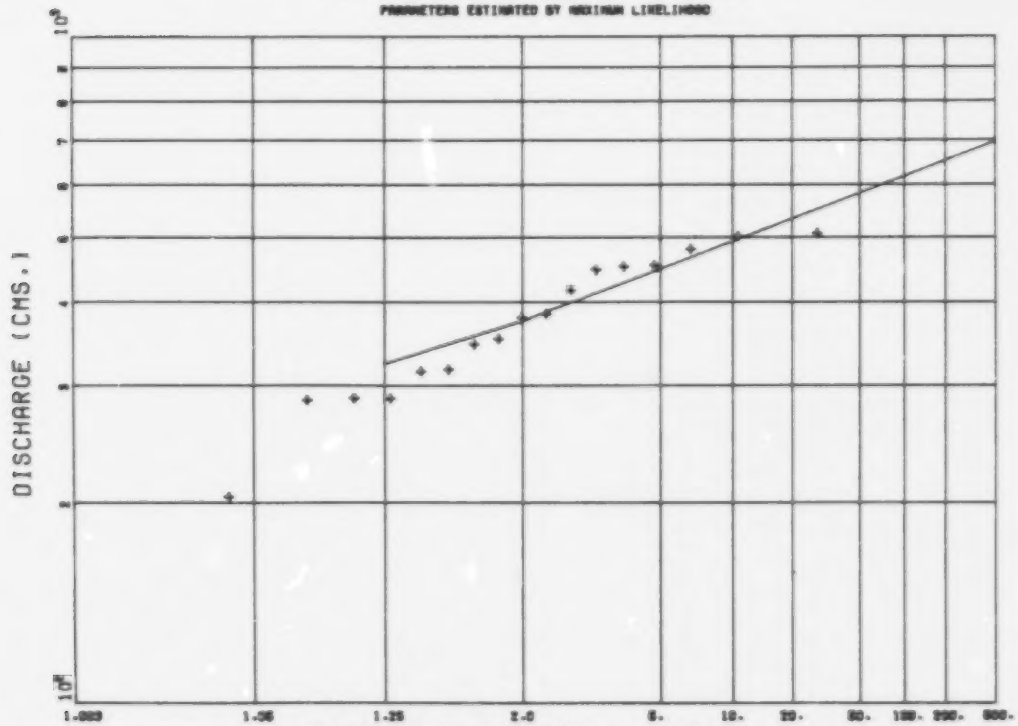
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 34.4769 M = 5.8447 S = .2268

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	323.
2.000	.500	374.
2.330	.429	389.
5.000	.200	448.
10.000	.100	493.
20.000	.050	537.
50.000	.020	582.
100.000	.010	617.
200.000	.005	651.
500.000	.002	695.

NIPIGON RIVER BELOW VIRGIN FALLS 02AD006
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I241.0

NITH RIVER ABOVE NITHBURG 02GA038

DRAINAGE AREA = 326.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1972 - 1982

SAMPLE STATISTICS
MEAN = 213. S.D. = 64.2 C.S. = -.2525 C.K. = 2.1913
SAMPLE STATISTICS (LOGS)
MEAN = 5.3174 S.D. = .3248 C.S. = -.3816 C.K. = 2.2132
SAMPLE MIN = 135. SAMPLE MAX = 289. N = 11

PARAMETERS FOR GUMBEL I A = .017993 U = 182.
PARAMETERS FOR LOGNORMAL M = 5.3174 S = .3248

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8618 B = .2747E+02 LOG(M) = 7.0158
ME= .1114E+04

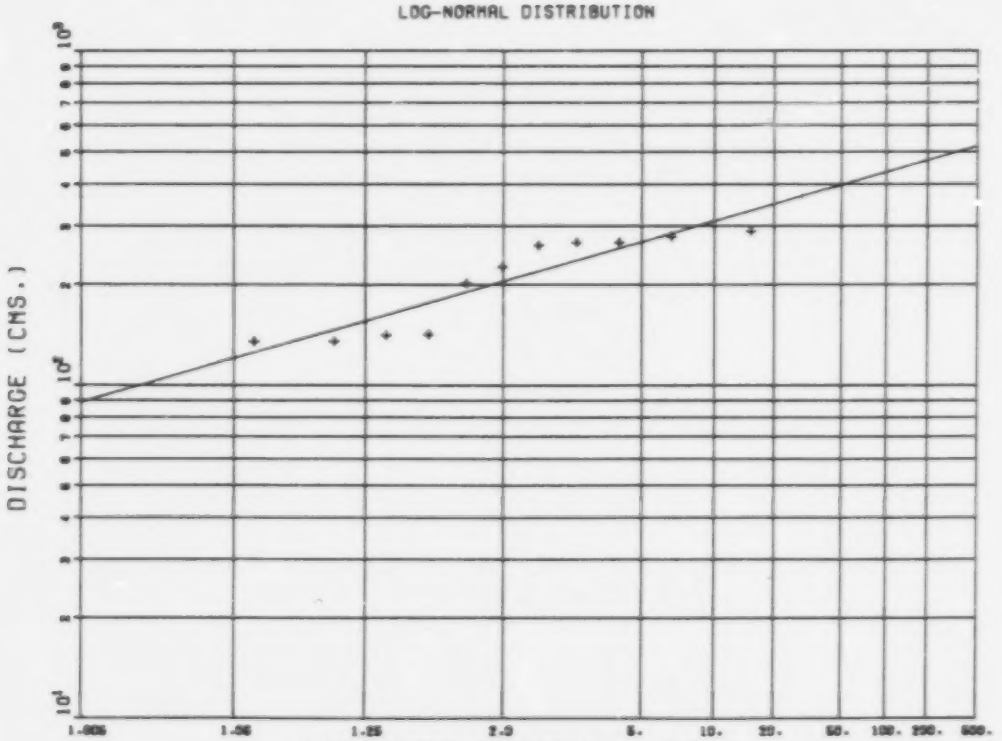
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	90.		88.		0.		0.		79.	
1.050	120.		120.		0.		0.		116.	
1.250	156.		155.		0.		0.		156.	
2.000	203.		204.		0.		0.		208.	
2.330	214.	9.91	216.	9.85	0.	0.00	0.	0.00	220.	10.50
5.000	266.	11.40	268.	11.40	0.	0.00	0.	0.00	269.	10.20
10.000	307.	12.60	309.	13.20	0.	0.00	0.	0.00	304.	11.20
20.000	347.	13.60	347.	15.00	0.	0.00	0.	0.00	335.	12.40
50.000	399.	14.80	397.	17.20	0.	0.00	0.	0.00	371.	17.60
100.000	438.	15.50	433.	18.80	0.	0.00	0.	0.00	395.	21.20
200.000	477.	16.10	470.	20.30	0.	0.00	0.	0.00	419.	25.20
500.000	528.	16.70	518.	22.20	0.	0.00	0.	0.00	448.	30.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NITH RIVER ABOVE NITHBURG 02GA038

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1342.0

NITH RIVER AT NEW HAMBURG 02GA018

DRAINAGE AREA = 552.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1951 - 1982

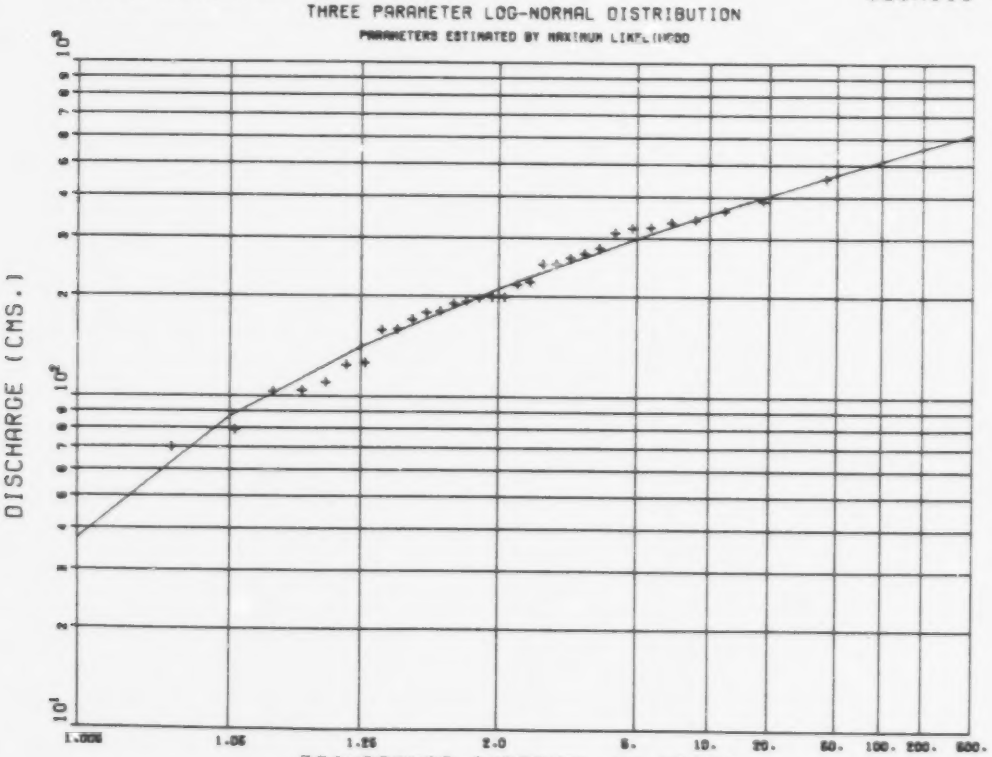
SAMPLE STATISTICS
MEAN = 223. S.D. = 95.8 C.S. = .4486 C.K. = 2.9395
SAMPLE STATISTICS (LOGS)
MEAN = 5.3060 S.D. = .4696 C.S. = -.4655 C.K. = 2.9727
SAMPLE MIN = 70. SAMPLE MAX = 453. N = 32

PARAMETERS FOR GUMBEL I A = .012529 U = 177.
PARAMETERS FOR LOGNORMAL M = 5.3060 S = .4696
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -136. M = 5.8484 S = .2688
STATISTICS OF LOG(X-A)
MEAN = 5.8484 S.D. = .2688 C.S. = -.0712 C.K. = 2.6483
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1193 B = .1846E+02 LOG(M) = 7.3236
ME= .1516E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1884 B = .6297E+01
LOG(M)= 6.4925 M = .6602E+03
DISTRIBUTION STATISTICS MEAN = 5.3060 S.D. = .4728 C.S. = -.7970

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	44.		68.		37.		42.		49.	
1.050	88.		93.		86.		85.		88.	
1.250	139.		136.		140.		140.		138.	
2.000	207.		202.		210.		214.		209.	
2.330	224.	8.01	219.	8.37	227.	8.15	232.	8.20	227.	8.02
5.000	297.	8.56	299.	9.66	298.	8.07	302.	7.50	301.	8.47
10.000	357.	9.14	360.	11.20	353.	9.13	350.	7.39	358.	9.14
20.000	414.	9.63	436.	12.70	403.	10.70	389.	7.75	426.	11.00
50.000	489.	10.20	529.	14.60	466.	13.10	432.	8.86	469.	14.50
100.000	545.	10.50	601.	16.00	511.	15.00	460.	10.10	512.	17.70
200.000	600.	10.70	676.	17.30	557.	16.80	484.	11.50	552.	21.00
500.000	673.	11.00	779.	18.80	616.	19.30	511.	13.50	602.	25.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NITH RIVER AT NEW HAMBURG 02GA018
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I243.0

NITH RIVER NEAR CANNING 02GA010

DRAINAGE AREA : 1030.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1948 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	253.	94.	.175	2.761
LN X SERIES	5.46	.43	-.895	4.541

X(MIN)= 67. CMS. TOTAL SAMPLE SIZE= 35
X(MAX)= 428. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

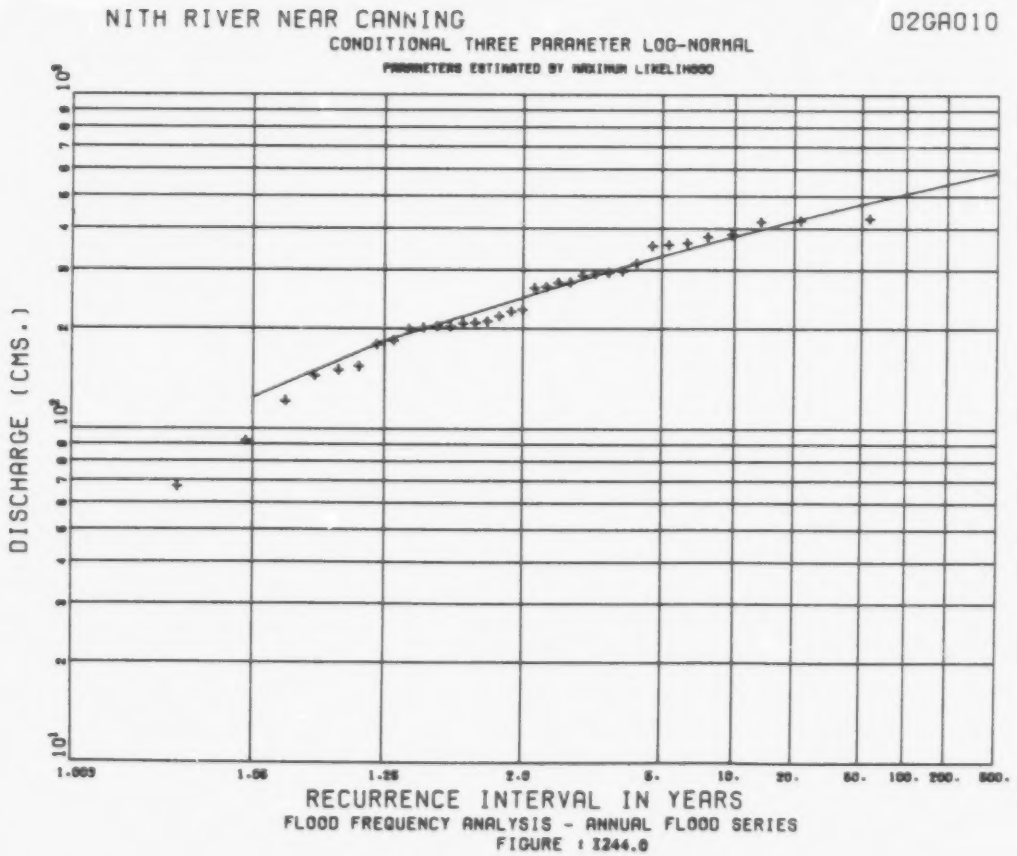
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	259.	90.	.249	2.682
LN X SERIES	5.49	.37	-.483	3.455
LN (X-A) SERIES	6.18	.18	-.844	2.763

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -232.0192 M = 6.1795 S = .1839

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	124.
1.250	.800	183.
2.000	.500	247.
2.330	.429	264.
5.000	.200	329.
10.000	.100	377.
20.000	.050	420.
50.000	.020	471.
100.000	.010	507.
200.000	.005	542.
500.000	.002	586.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I244.0

NOLIN CREEK AT SUDBURY 02CF009

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

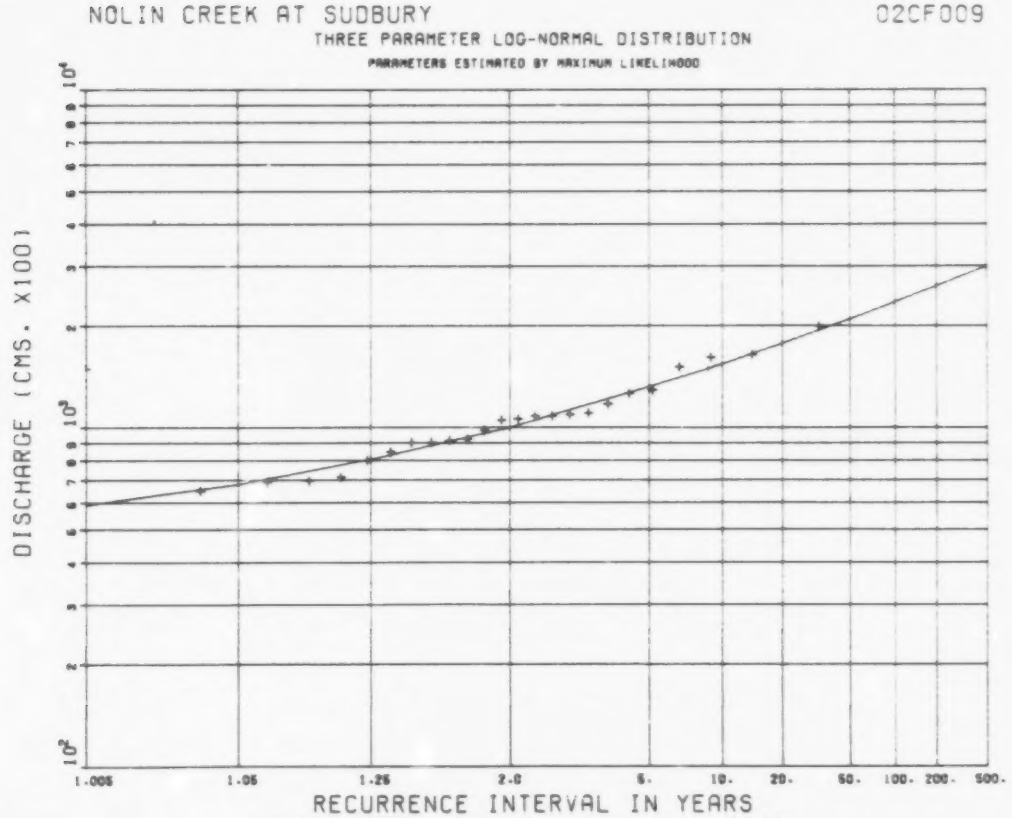
DRAINAGE AREA : 21.6 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1959 - 1982

SAMPLE STATISTICS
MEAN = 1041. S.D. = 334.2 C.S. = 1.0983 C.K. = 4.5476
SAMPLE STATISTICS (LOGS)
MEAN = 6.9442 S.D. = .2904 C.S. = .4123 C.K. = 3.2730
SAMPLE MIN = 650. SAMPLE MAX = 1990. N = 24

PARAMETERS FOR GUMBEL I A = .014113 U = 935.
PARAMETERS FOR LOGNORMAL M = 6.9442 S = .2904
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 441. M = 6.3215 S = .5280
STATISTICS OF LOG(X-A)
MEAN = 6.3215 S.D. = .5280 C.S. = -.1124 C.K. = 3.3710
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0598 B = .2357E+02 LOG(M) = 5.5345
ME= .2533E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1000 B = .3383E+01
LOG(M)= 6.1351 M = .4443E+03
DISTRIBUTION STATISTICS MEAN = 6.9442 S.D. = .2837 C.S. = .6305

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	529.		431.		591.		591.		543.	
1.050	664.		643.		641.		686.		667.	
1.250	819.		812.		805.		809.		809.	
2.000	1020.		1040.		1062.		1070.		1020.	
2.330	1080.	5.35	1090.	5.97	1063.	6.57	1060.	6.33	1070.	5.63
5.000	1300.	6.88	1320.	6.90	1323.	9.27	1300.	8.08	1310.	7.67
10.000	1480.	7.74	1500.	8.00	1540.	10.60	1530.	10.50	1520.	9.66
20.000	1660.	8.47	1670.	9.09	1772.	13.40	1750.	13.60	1730.	12.50
50.000	1880.	9.27	1860.	10.50	2090.	17.30	2080.	17.90	2000.	17.00
100.000	2050.	9.77	2040.	11.40	2351.	20.40	2350.	21.60	2220.	20.70
200.000	2220.	10.20	2190.	12.30	2629.	23.40	2640.	25.40	2450.	24.80
500.000	2450.	10.70	2390.	13.40	2991.	27.40	3060.	30.60	2770.	30.30

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I245.0

NORTH BRANCH MUSKOKA RIVER AT PORT SYDNEY 02EB004

DRAINAGE AREA : 1398.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1916 - 1982

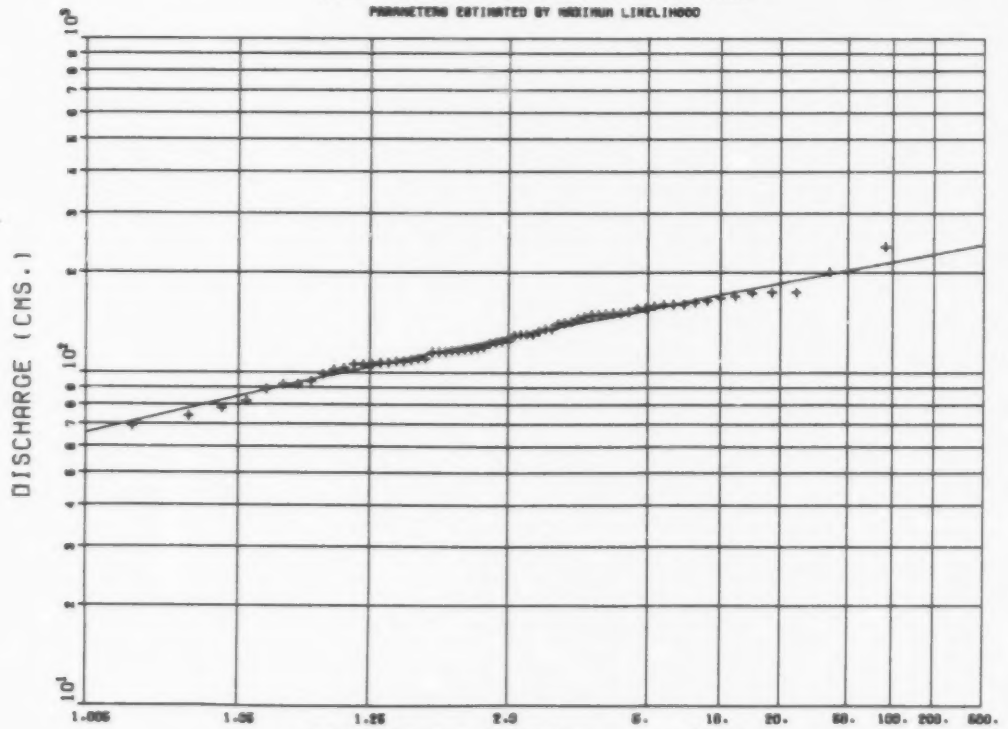
SAMPLE STATISTICS
MEAN = 130. S.D. = 30.8 C.S. = .6252 C.K. = 4.2917
SAMPLE STATISTICS (LOGS)
MEAN = 4.8390 S.D. = .2380 C.S. = -.1638 C.K. = 3.3235
SAMPLE MIN = 69. SAMPLE MAX = 238. N = 67

PARAMETERS FOR GUMBEL I A = .037360 U = 115.
PARAMETERS FOR LOGNORMAL M = 4.8390 S = .2380
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -36. M = 5.0940 S = .1841
STATISTICS OF LOG(X-A)
MEAN = 5.0940 S.D. = .1841 C.S. = .0822 C.K. = 3.3118
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0195 B = .1491E+03 LOG(M) = 7.7454
ME= .2311E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0174 B = .1834E+03
LOG(M)= 8.0373 M = .3094E+04
DISTRIBUTION STATISTICS MEAN = 4.8390 S.D. = .2362 C.S. = -.1477

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	71.		68.		66.		67.		66.	
1.050	86.		85.		85.		85.		85.	
1.250	103.		103.		104.		104.		104.	
2.000	125.		126.		127.		127.		127.	
2.330	131.	3.17	132.	2.93	133.	3.07	133.	3.10	133.	3.13
5.000	155.	3.79	154.	3.38	154.	3.23	154.	3.24	155.	3.25
10.000	176.	4.31	171.	3.92	171.	3.76	170.	3.70	171.	3.71
20.000	195.	4.75	187.	4.46	185.	4.52	184.	4.46	185.	4.47
50.000	220.	5.23	206.	5.13	202.	5.71	201.	5.75	202.	5.80
100.000	238.	5.54	220.	5.60	214.	6.65	213.	6.87	214.	6.95
200.000	257.	5.81	233.	6.04	226.	7.62	225.	8.06	225.	8.18
500.000	282.	6.12	251.	6.60	241.	8.92	239.	9.71	239.	9.87

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH BRANCH MUSKOKA RIVER AT PORT SYDNEY 02EB004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1346.0

NORTH BRANCH MUSKOKA RIVER NEAR PORT SYDNEY 02EB007

DRAINAGE AREA : 1440.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1940 - 1962

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	130.	34.	-.345	2.963
LN X SERIES	4.84	.25	-.861	4.128

X(MIN)= 67. CMS. TOTAL SAMPLE SIZE= 23
X(MAX)= 169. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	133.	27.	-.702	2.717
LN X SERIES	4.86	.22	-.588	3.538
LN (X-A) SERIES	4.85	.21	-.092	2.420

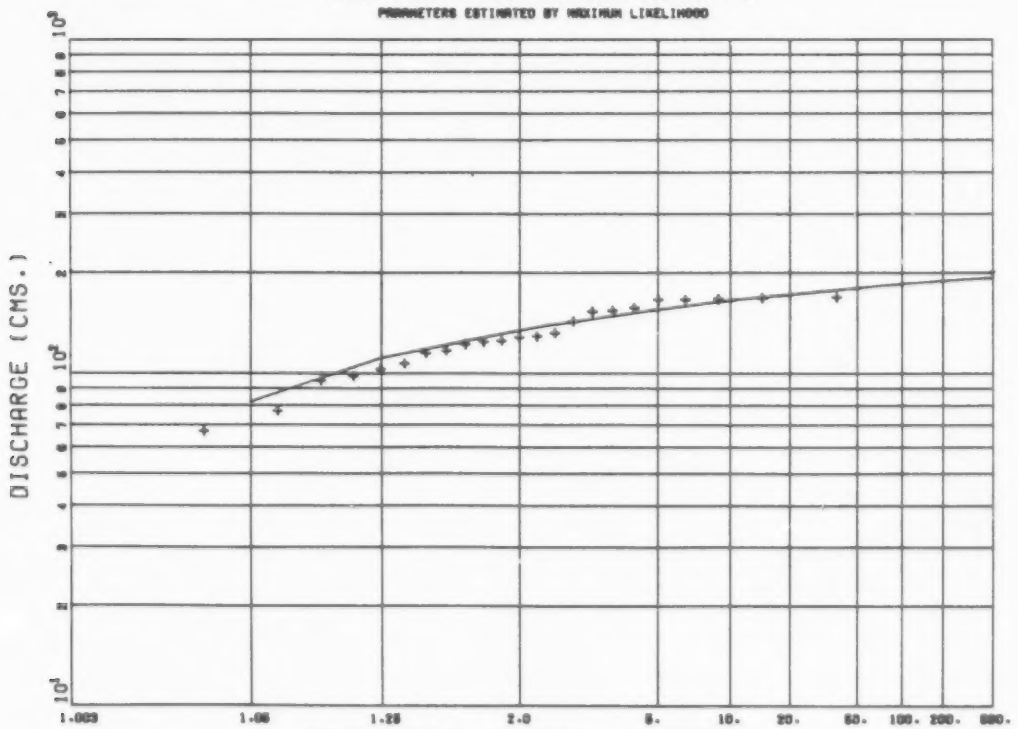
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 263.0846 M = 4.8589 S = .2116

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	82.
1.250	.800	111.
2.000	.500	134.
2.330	.429	139.
5.000	.200	155.
10.000	.100	165.
20.000	.050	172.
50.000	.020	180.
100.000	.010	185.
200.000	.005	189.
500.000	.002	193.

NORTH BRANCH MUSKOKA RIVER NEAR PORT SYDNEY 02EB007
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1247.0

NORTH CREEK AT DELHI 02GC005

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 54.4 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1955 - 1966

SAMPLE STATISTICS
MEAN = 1087. S.D. = 1214.1 C.S. = 2.3336 C.K. = 10.0211
SAMPLE STATISTICS (LOGS)
MEAN = 6.5772 S.D. = .9033 C.S. = .6499 C.K. = 3.9885
SAMPLE MIN = 216. SAMPLE MAX = 4499. N = 12

PARAMETERS FOR GUMBEL I A = .001633 U = 647.
PARAMETERS FOR LOGNORMAL M = 6.5772 S = .9033
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 198. M = 5.9392 S = 1.5346
STATISTICS OF LOG(X-A)
MEAN = 5.9392 S.D. = 1.5346 C.S. = -.4874 C.K. = 4.2080
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2935 B = .1946E+01 LOG(M) = 3.7977
ME= .4480E+02

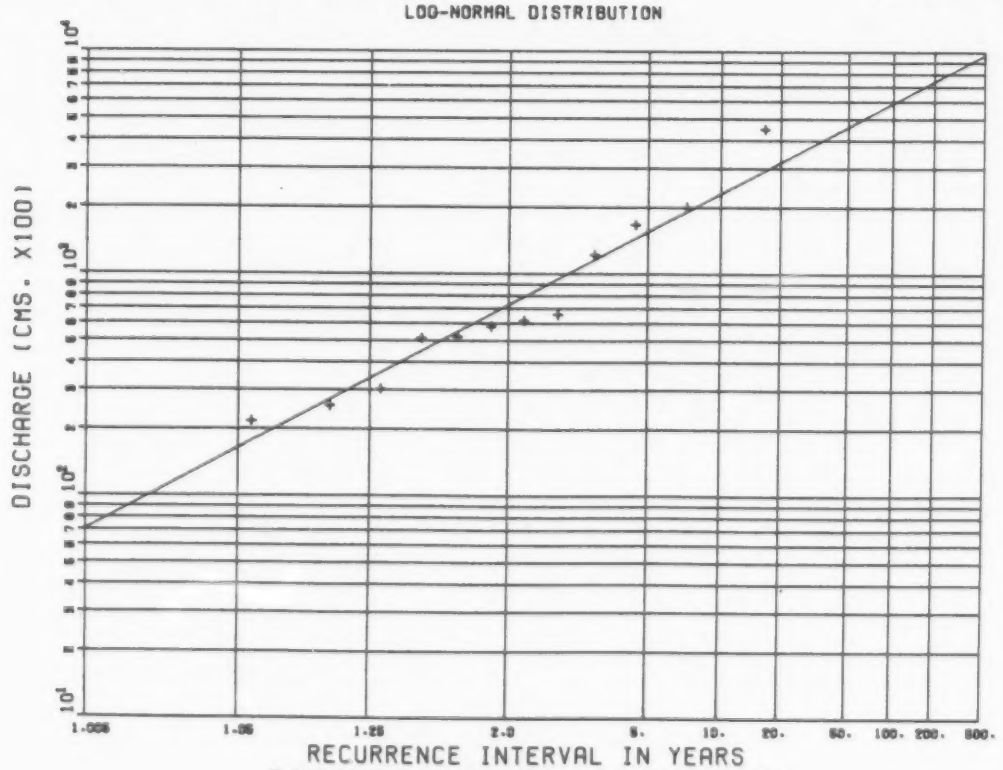
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-375.		78.		285.		0.		120.	
1.050	-35.		163.		228.		0.		195.	
1.250	356.		336.		302.		0.		332.	
2.000	872.		719.		670.		0.		652.	
2.330	1000.	22.40	846.	26.30	797.	32.10	0.	0.00	766.	29.90
5.000	1570.	20.30	1540.	30.30	1530.	45.20	0.	0.00	1470.	35.60
10.000	2030.	20.20	2290.	35.20	2910.	56.30	0.	0.00	2390.	46.30
20.000	2470.	20.30	3170.	40.00	4940.	66.30	0.	0.00	3670.	61.70
50.000	3040.	20.50	4590.	46.00	9040.	78.10	0.	0.00	6190.	86.60
100.000	3460.	20.60	5870.	50.20	13700.	86.50	0.	0.00	8960.	108.00
200.000	3890.	20.80	7360.	54.20	20000.	94.20	0.	0.00	12800.	130.00
500.000	4450.	20.90	9698.	59.20	31700.	104.00	0.	0.00	20100.	161.00

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT

NORTH CREEK AT DELHI 02GC005

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I248.0
T-262

NORTH CURRENT RIVER NEAR THUNDER BAY 02AB014

DRAINAGE AREA : 112.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1983

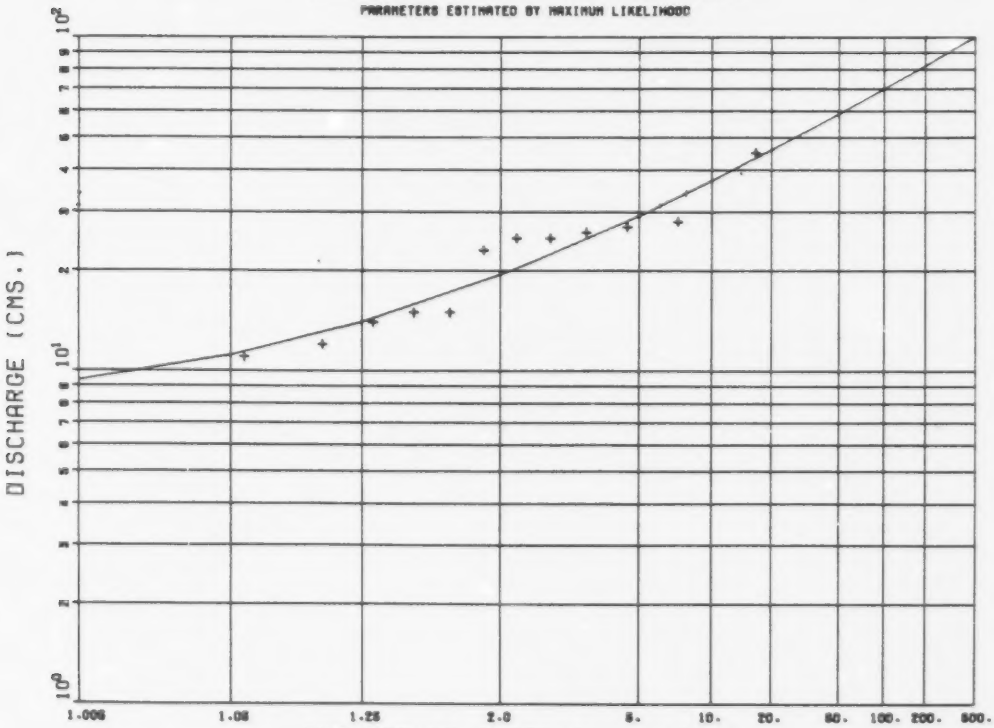
SAMPLE STATISTICS
MEAN = 22. S.D. = 9.6 C.S. = 1.0693 C.K. = 5.8177
SAMPLE STATISTICS (LOGS)
MEAN = 3.0170 S.D. = .4215 C.S. = .1116 C.K. = 3.3807
SAMPLE MIN = 11. SAMPLE MAX = 45. N = 12

PARAMETERS FOR GUMBEL I A = .143009 U = 18.
PARAMETERS FOR LOGNORMAL M = 3.0170 S = .4215
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 7. M = 2.4805 S = .7104
STATISTICS OF LOG(X-A)
MEAN = 2.4805 S.D. = .7104 C.S. = -.3080 C.K. = 3.1616
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0235 B = .3211E+03 LOG(M) =-4.5367
ME= .1071E-01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0989 B = .1720E+02
LOG(M)F= 1.3156 M = .3727E+01
DISTRIBUTION STATISTICS MEAN = 3.0170 S.D. = .4103 C.S. = .4823

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6.		7.		9.		9.		7.	
1.050	10.		10.		11.		11.		10.	
1.250	15.		14.		14.		14.		14.	
2.000	21.		20.		19.		20.		20.	
2.330	22.	11.60	22.	12.30	21.	13.80	21.	12.80	22.	13.20
5.000	29.	12.40	29.	14.20	29.	17.80	29.	15.50	29.	14.70
10.000	34.	13.80	35.	16.40	37.	22.80	35.	19.70	35.	17.60
20.000	39.	14.70	41.	18.70	46.	28.30	42.	25.00	41.	21.80
50.000	45.	15.70	49.	21.50	59.	35.70	53.	33.30	50.	28.70
100.000	50.	16.30	55.	23.40	70.	41.10	61.	40.00	56.	34.50
200.000	55.	16.80	61.	25.30	82.	46.50	71.	47.20	63.	40.70
500.000	61.	17.30	69.	27.60	100.	53.30	85.	57.00	73.	49.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH CURRENT RIVER NEAR THUNDER BAY 02AB014
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I249.0

NORTH FRENCH RIVER NEAR THE MOUTH 04MF001

DRAINAGE AREA : 5680.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	709.	298.	-.782	4.240
LN X SERIES	6.49	.46	-1.782	7.921

X(MIN)= 184. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 1007. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

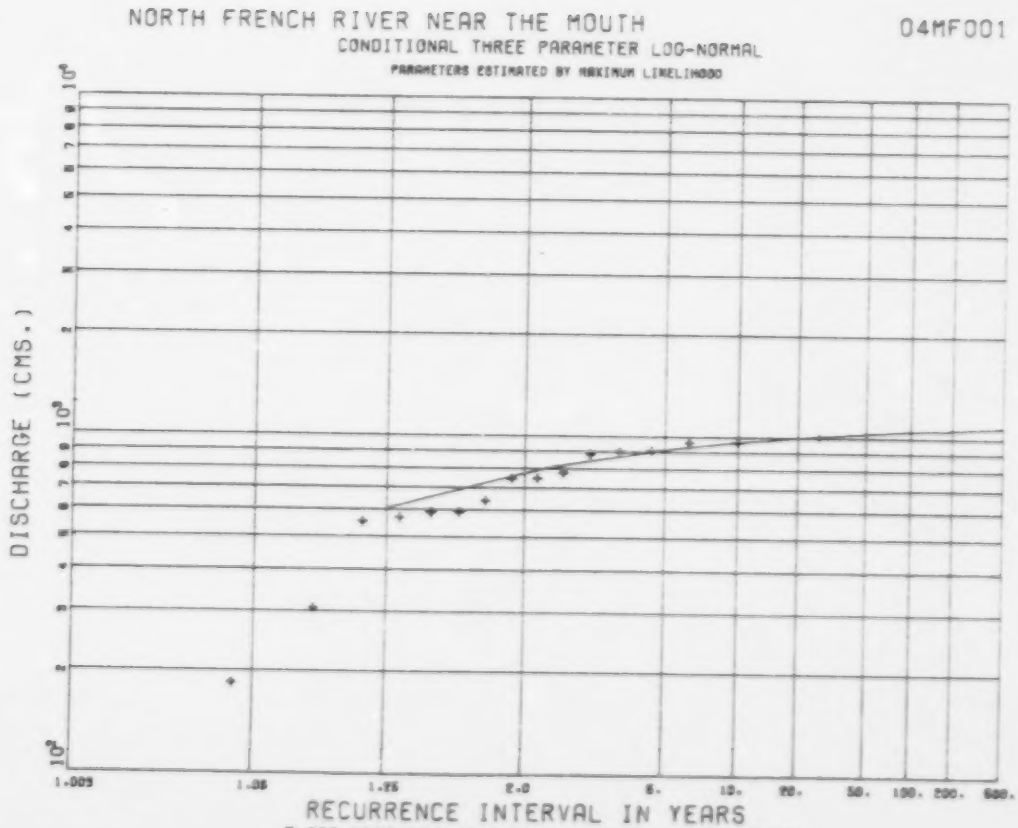
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	744.	220.	-.661	3.385
LN X SERIES	6.57	.31	-1.568	6.975
LN (X-A) SERIES	5.94	.50	-.214	3.019

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1167.4660 M = 5.9365 S = .5003

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	634.
2.000	.500	771.
2.330	.429	808.
5.000	.200	913.
10.000	.100	964.
20.000	.050	999.
50.000	.020	1030.
100.000	.010	1050.
200.000	.005	1060.
500.000	.002	1080.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I250.G

NORTH MAGNETAWAN RIVER ABOVE PICKEREL LAKE 02EA010

DRAINAGE AREA : 149.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

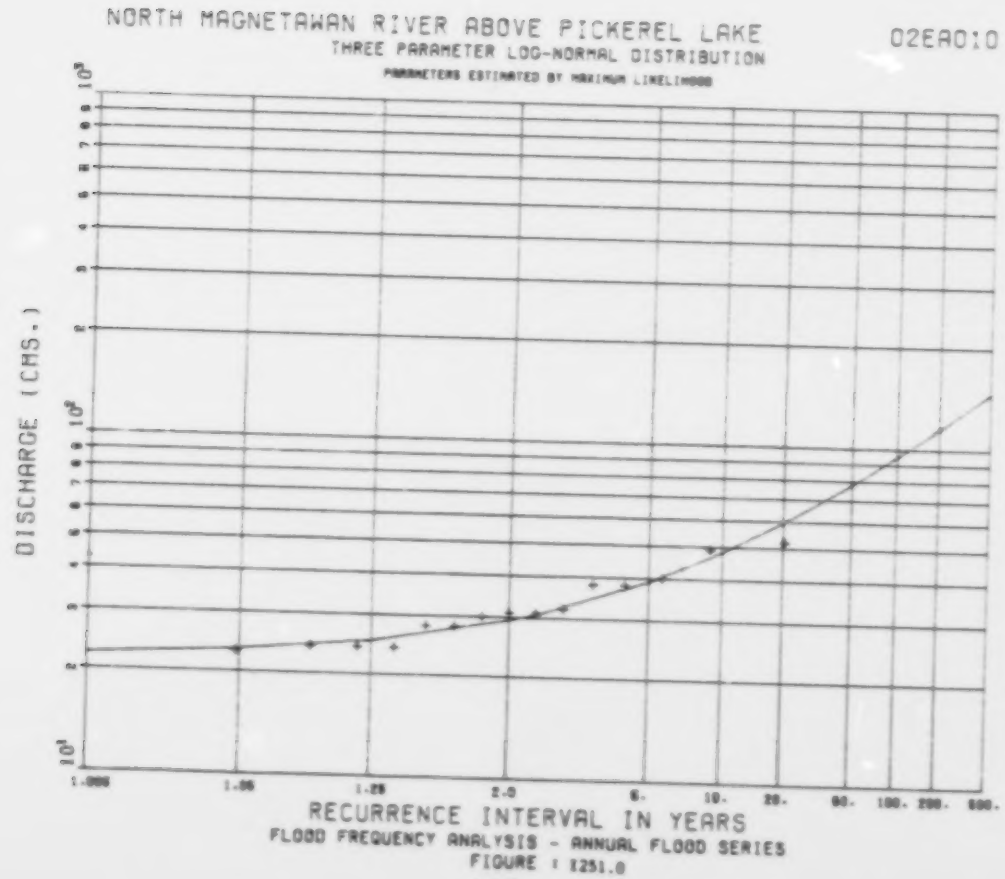
SAMPLE STATISTICS
MEAN = 33. S.D. = 9.8 C.S. = .9385 C.K. = 4.3280
SAMPLE STATISTICS (LOGS)
MEAN = 3.4944 S.D. = .2570 C.S. = .5870 C.K. = 3.2538
SAMPLE MIN = 23. SAMPLE MAX = 52. N = 15

PARAMETERS FOR GUMBEL I A = .159855 U = 29.
PARAMETERS FOR LOGNORMAL P = 3.4584 S = .2570
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 22. M = 2.3336 S = .9723
STATISTICS OF LOG(X-A)
MEAN = 2.0336 S.D. = .9723 C.S. = -.4263 C.K. = 2.9526
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8754 B = .1161E+02 LOG(M) = 2.5828
ME= .1323E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	18.		16.		22.		0.		13.	
1.050	22.		21.		23.		0.		20.	
1.250	26.		24.		25.		0.		24.	
2.000	31.		30.		29.		0.		30.	
2.330	33.	6.33	32.		30.		0.		31.	
5.000	38.	7.63	33.	6.59	31.	7.62	0.	0.00	36.	7.53
10.000	43.	8.72	39.	7.72	39.	13.00	0.	0.00	53.	8.93
20.000	48.	9.65	44.	8.96	48.	19.10	0.	0.00	47.	11.50
50.000	53.	10.70	49.	10.20	60.	25.70	0.	0.00	50.	15.20
100.000	58.	11.30	54.	11.70	78.	34.70	0.	0.00	54.	21.20
200.000	62.	11.90	58.	12.80	95.	41.10	0.	0.00	94.	26.20
500.000	68.	12.60	63.	15.10	115.	47.60	0.	0.00	71.	31.60
			67.		147.	55.60	0.	0.00	80.	39.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1251.0

NORTH MAGNETAWAN RIVER NEAR BURK+S FALLS 02EA005

DRAINAGE AREA : 321.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1916 - 1982

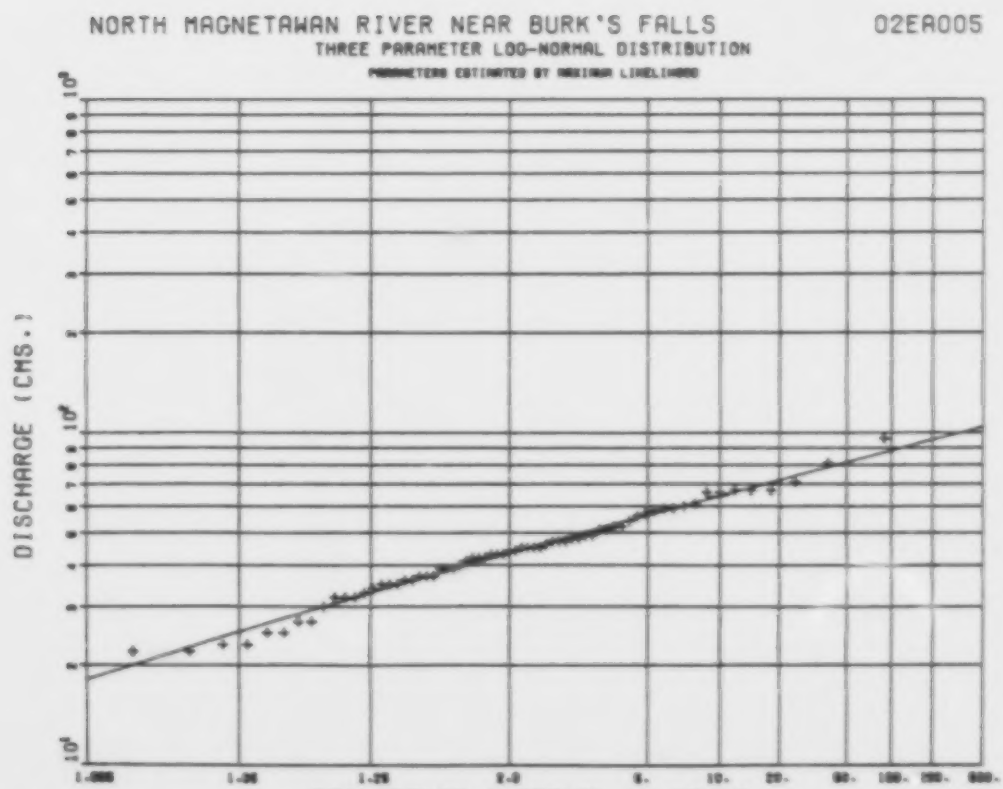
SAMPLE STATISTICS
MEAN = 45. S.D. = 14.5 C.S. = .8553 C.K. = 4.4991
SAMPLE STATISTICS (LOGS)
MEAN = 3.7615 S.D. = .3191 C.S. = -.1287 C.K. = 3.0923
SAMPLE MIN = 22. SAMPLE MAX = 96. N = 67

PARAMETERS FOR GUMBEL I A = .084481 U = 39.
PARAMETERS FOR LOGNORMAL M = 3.7615 S = .3191
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -6. M = 3.8876 S = .2810
STATISTICS OF LOG(X-A)
MEAN = 3.8876 S.D. = .2810 C.S. = -.0170 C.K. = 3.1811
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0193 B = .2744E+03 LOG(M) = 9.8472
ME= .8495E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0201 B = .2472E+03
LOG(M)F= 8.7417 M = .6258E+04
DISTRIBUTION STATISTICS MEAN = 3.7615 S.D. = .3167 C.S. = -.1272

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	19.		19.		18.		18.		18.	
1.050	25.		25.		25.		25.		25.	
1.250	33.		33.		33.		33.		33.	
2.000	43.		43.		43.		43.		43.	
2.330	45.	4.04	46.	3.93	46.	4.12	46.	4.16	46.	4.20
5.000	56.	4.63	56.	4.54	56.	4.39	56.	4.37	56.	4.41
10.000	65.	5.13	65.	5.26	64.	5.16	64.	5.02	65.	5.07
20.000	74.	5.55	73.	5.98	72.	6.22	72.	6.05	72.	6.14
50.000	85.	6.00	83.	6.87	81.	7.20	81.	7.82	81.	7.97
100.000	93.	6.29	90.	7.50	88.	9.04	87.	9.35	88.	9.54
200.000	101.	6.53	98.	8.10	95.	10.30	94.	11.00	94.	11.20
500.000	112.	6.80	108.	8.84	104.	12.00	102.	13.20	103.	13.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH MAGNETAWAN RIVER NEAR BURK'S FALLS 02EA005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I252.0

NORTH SAUGEEN RIVER NEAR PAISLEY 02FC013

DRAINAGE AREA = 262.0 SQ. KM.
REGULATED FLOW = CLASS 2
PERIOD OF RECORD = 1972 - 1982

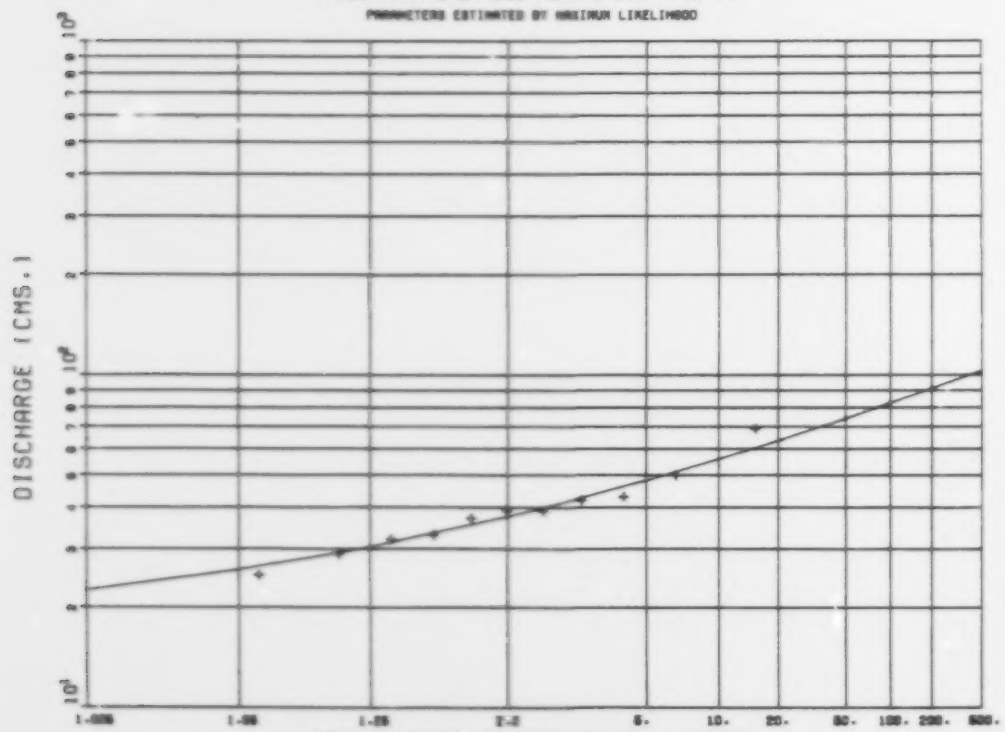
SAMPLE STATISTICS
MEAN = 40. S.D. = 11.9 C.S. = 1.4830 C.K. = 7.2721
SAMPLE STATISTICS (LOGS)
MEAN = 3.6483 S.D. = .2748 C.S. = .6589 C.K. = 5.2966
SAMPLE MIN = 25. SAMPLE MAX = 69. N = 11

PARAMETERS FOR GUMBEL I A = .121952 U = 35.
PARAMETERS FOR LOGNORMAL M = 3.6483 S = .2748
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 17. M = 3.8193 S = .5000
STATISTICS OF LOG(X-A)
MEAN = 3.6193 S.D. = .5000 C.S. = -.8323 C.K. = 4.8223
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8694 B = .9442E+01 LOG(P) = 2.8040
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1651E+02
A = .8842 B = .9778E+01
LOG(P)F= 2.8248 M = .1686E+02
DISTRIBUTION STATISTICS MEAN = 3.6483 S.D. = .2634 C.S. = .6396

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	21.		19.		23.		23.		22.	
1.050	26.		24.		26.		26.		26.	
1.250	31.		31.		30.		31.		30.	
2.000	38.		38.		37.		37.		37.	
2.330	40.	7.92	40.	8.35	39.	9.09	39.	8.53	39.	9.49
5.000	47.	9.45	48.	9.64	48.	11.40	47.	10.70	48.	11.30
10.000	53.	10.70	55.	11.20	54.	14.60	55.	13.90	55.	14.70
20.000	59.	11.80	60.	12.70	64.	18.40	62.	17.80	63.	19.60
50.000	67.	13.00	68.	14.60	76.	25.50	72.	23.70	74.	27.50
100.000	73.	13.80	73.	15.90	82.	30.20	80.	28.50	83.	34.20
200.000	78.	14.40	78.	17.20	91.	42.50	89.	33.50	92.	41.30
500.000	86.	15.20	85.	18.80	103.	58.20	101.	40.50	106.	51.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH SAUGEEN RIVER NEAR PAISLEY 02FC013
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1253.0
I-367

NORTH THAMES RIVER BELOW FANSHAWE DAM (1916-44) 02GD003

DRAINAGE AREA : 1450.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1916 - 1944

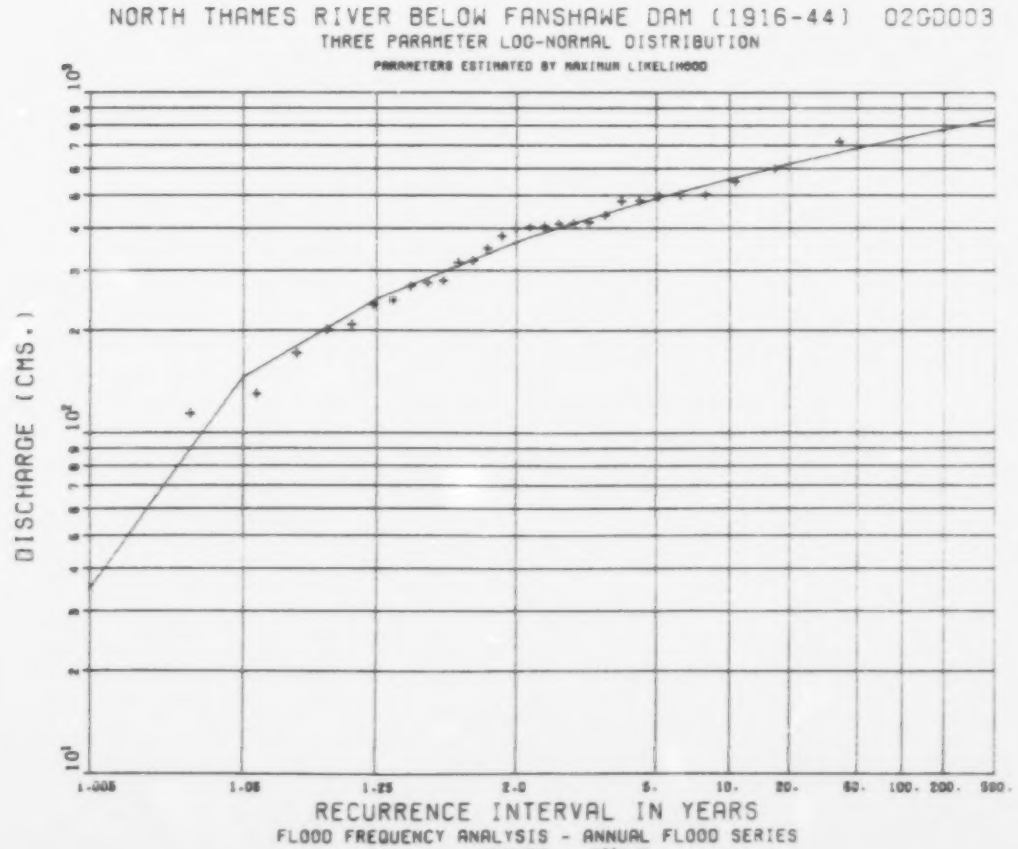
SAMPLE STATISTICS
MEAN = 369. S.D. = 143.6 C.S. = .2067 C.K. = 3.2410
SAMPLE STATISTICS (LOGS)
MEAN = 5.8264 S.D. = .4455 C.S. = -.7949 C.K. = 3.6240
SAMPLE MIN = 114. SAMPLE MAX = 716. N = 29

PARAMETERS FOR GUMBEL I A = .007756 U = 300.
PARAMETERS FOR LOGNORMAL M = 5.8264 S = .4455
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1221. M = 7.3678 S = .0902
STATISTICS OF LOG(X-A)
MEAN = 7.3678 S.D. = .0902 C.S. = -.0153 C.K. = 3.0244
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1770 B = .6332E+01 LOG(M) = 6.9474
ME= .1040E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1945 B = .5085E+01
LOG(M)F= 6.3156 M = .9119E+03
DISTRIBUTION STATISTICS MEAN = 5.8264 S.D. = .4367 C.S. = -.8869

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	85.		108.		35.		76.		77.	
1.050	157.		163.		145.		150.		15[illegible].	
1.250	239.		233.		247.		242.		24[illegible].	
2.000	347.		339.		363.		351.		35[illegible].	
2.333	375.	8.13	367.	8.34	389.	7.49	389.	7.03	387.	5.98
5.000	497.	9.74	493.	9.63	488.	6.85	493.	7.23	49[illegible].	7.49
10.000	590.	9.37	600.	11.28	557.	7.37	561.	6.78	57[illegible].	7.95
20.000	683.	9.91	706.	12.70	617.	8.42	616.	6.91	63[illegible].	10.13
50.000	802.	10.50	847.	14.60	686.	10.20	673.	7.66	69[illegible].	14.49
100.000	892.	10.60	956.	15.90	733.	11.60	708.	8.56	73[illegible].	18.33
200.000	982.	11.10	1070.	17.20	779.	13.00	739.	9.63	77[illegible].	21.70
500.000	1100.	11.50	1220.	18.80	833.	14.90	772.	11.20	816.	26.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH THAMES RIVER BELOW FANSHAWE DAM (1916-44) 02GD003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I254.0

NORTH THAMES RIVER BELOW FANSHAWE DAM (1954-82) 02GD003

DRAINAGE AREA : 1450.3 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1954 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	375.	129.	-.888	3.673
LN X SERIES	5.86	.41	-1.174	5.313

X(MIN)= 186. CMS.
X(MAX)= 654. CMS.
TOTAL SAMPLE SIZE= 29
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

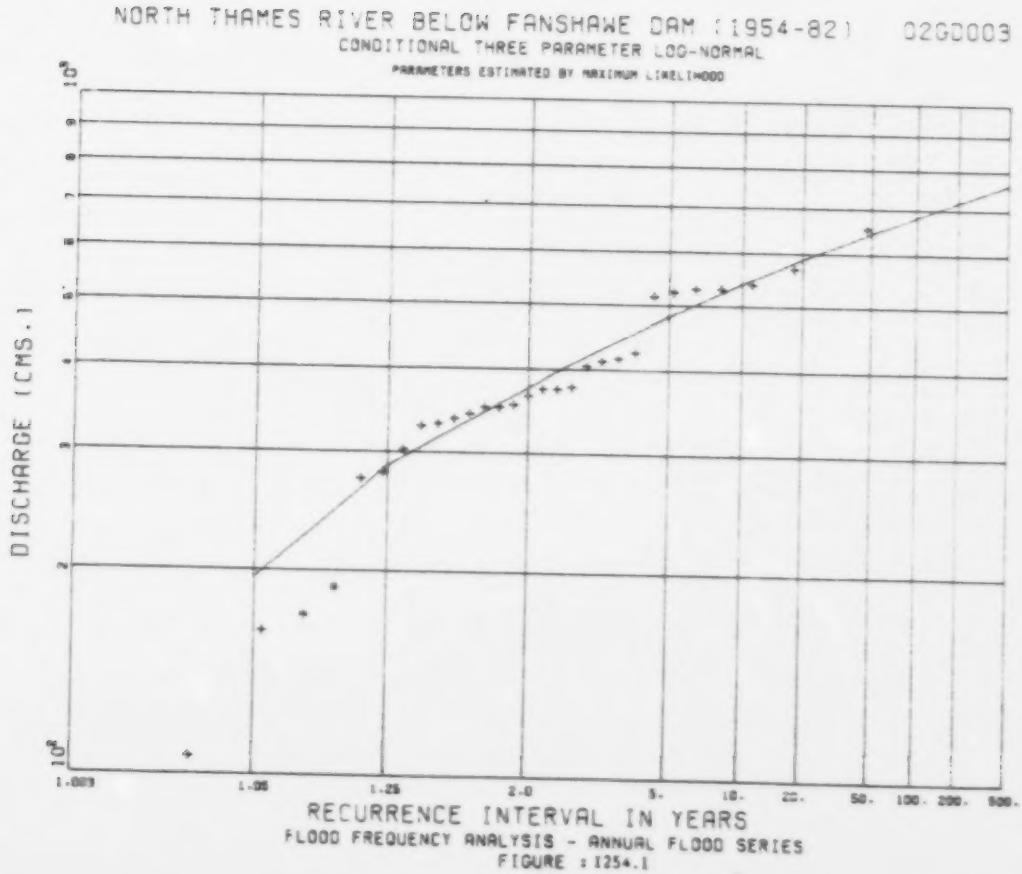
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	385.	120.	-.492	3.458
LN X SERIES	5.93	.34	-.748	4.252
LN (X-A) SERIES	7.39	.87	-.007	3.460

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -1236.2969 B = 7.3884 S = .8739

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	195.
1.250	.800	286.
2.000	.500	375.
2.330	.429	398.
5.000	.200	481.
10.000	.100	539.
20.000	.050	588.
50.000	.020	644.
100.000	.010	682.
200.000	.005	718.
500.000	.002	763.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I254.1

NORTH THAMES RIVER AT LONDON 02GD007

DRAINAGE AREA : 1700.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1944 - 1962

SAMPLE STATISTICS
MEAN = 520. S.D. = 251.9 C.S. = .8542 C.K. = 2.7255
SAMPLE STATISTICS (LOGS)
MEAN = 6.1287 S.D. = .5904 C.S. = -.8881 C.K. = 3.7670
SAMPLE MIN = 189. SAMPLE MAX = 1020. N = 19

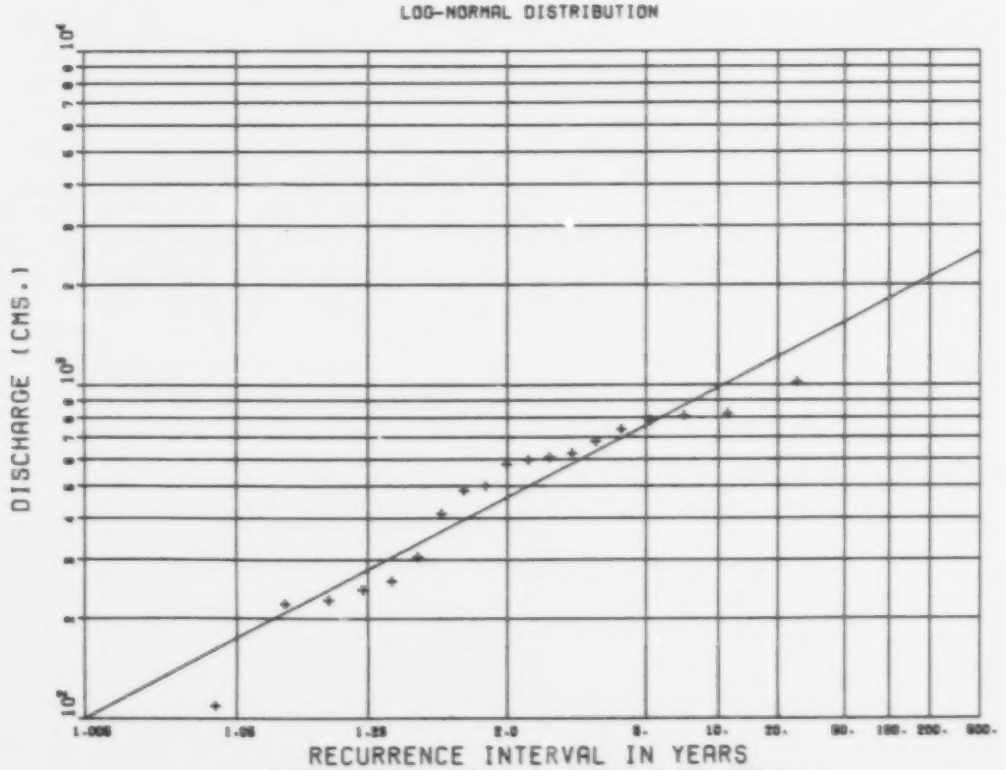
PARAMETERS FOR GUMBEL I A = .004506 U = 406.
PARAMETERS FOR LOGNORMAL M = 6.1287 S = .5904
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -5484. M = 8.7006 S = .0419
STATISTICS OF LOG(X-A)
MEAN = 8.7006 S.D. = .0419 C.S. = -.0146 C.K. = 2.6715
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2998 B = .5164E+01 LOG(M) = 7.4704
ME= .1795E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.4189 B = .2086E+01
LOG(M)F= 7.0016 M = .1098E+04
DISTRIBUTION STATISTICS MEAN = 6.1287 S.D. = .6044 C.S. =-1.3848

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	36.		100.		-92.		45.		62.	
1.050	159.		174.		123.		143.		154.	
1.250	381.		279.		315.		308.		291.	
2.000	487.		459.		523.		524.		499.	
2.330	534.	12.10	518.	13.70	560.	11.10	574.	0.00	551.	14.00
5.000	739.	12.40	754.	15.00	739.	9.47	757.	0.00	759.	11.00
10.000	905.	13.00	978.	18.30	854.	9.82	863.	0.00	905.	12.50
20.000	1070.	13.50	1210.	20.00	952.	11.00	937.	0.00	1030.	16.60
50.000	1270.	14.10	1540.	23.90	1060.	13.00	1000.	0.00	1160.	24.20
100.000	1430.	14.40	1810.	26.10	1140.	14.60	1030.	0.00	1240.	30.40
200.000	1580.	14.70	2100.	28.10	1210.	16.30	1060.	0.00	1310.	36.60
500.000	1780.	15.00	2510.	30.70	1290.	18.50	1000.	0.00	1390.	44.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

NORTH THAMES RIVER AT LONDON 02GD007

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I255.0

NORTH THAMES RIVER AT ST. MARY'S 02GD005

DRAINAGE AREA : 1860.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1948 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	426.	184.	-.013	2.669
LN X SERIES	5.94	.43	-1.078	4.256

X(MIN)= 91. CMS. TOTAL SAMPLE SIZE= 35
X(MAX)= 770. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

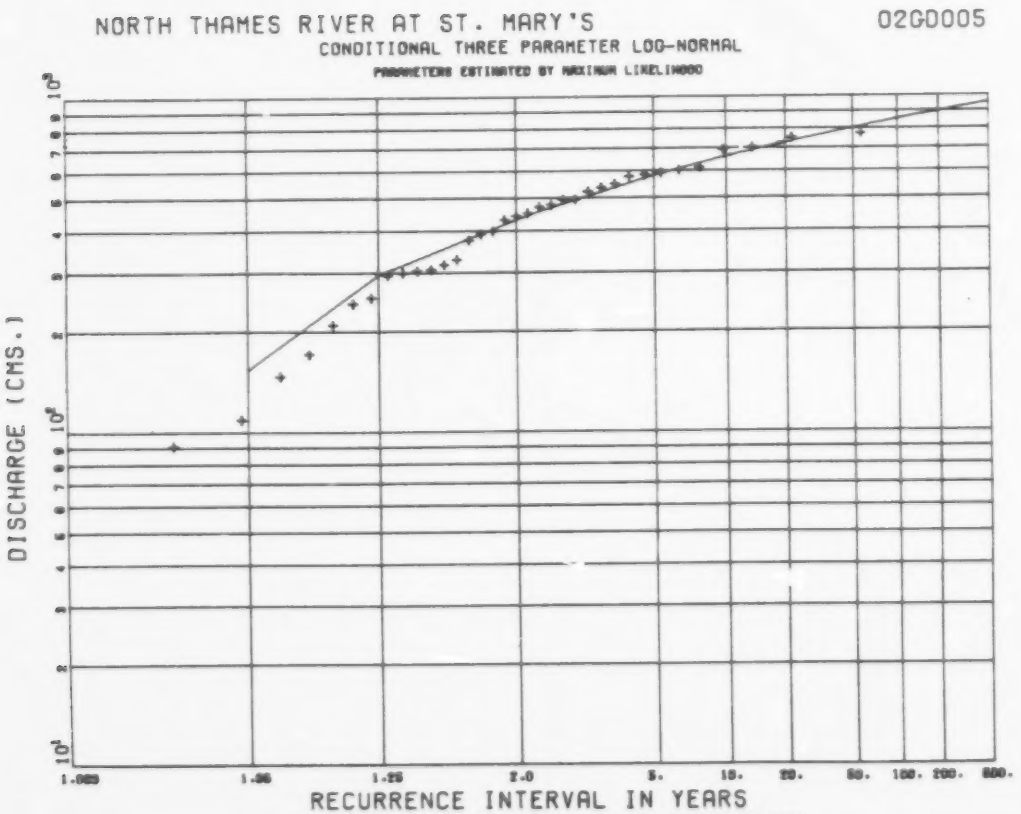
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	438.	174.	.636	2.678
LN X SERIES	5.99	.41	-.928	4.823
LN (X-A) SERIES	8.95	.02	-.006	2.673

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -7254.5647 M = 8.9477 S = .0226

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	153.
1.250	.800	294.
2.000	.500	429.
2.336	.429	461.
5.000	.200	580.
10.000	.100	659.
20.000	.050	725.
50.000	.020	799.
100.000	.010	849.
200.000	.005	895.
500.000	.002	951.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I256.0

NORTH THAMES RIVER NEAR MITCHELL 02GD014

DRAINAGE AREA : 319.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1955 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	231.	99.	.488	3.464
LN X SERIES	5.33	.43	-1.541	8.499

X(MIN)= 32. CMS. TOTAL SAMPLE SIZE= 28
X(MAX)= 447. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	238.	91.	.762	3.311
LN X SERIES	5.40	.39	-.034	3.335
LN (X-A) SERIES	5.40	.39	-.038	3.341

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = .8409 M = 5.3956 S = .3989

FLOOD FREQUENCY REGIME

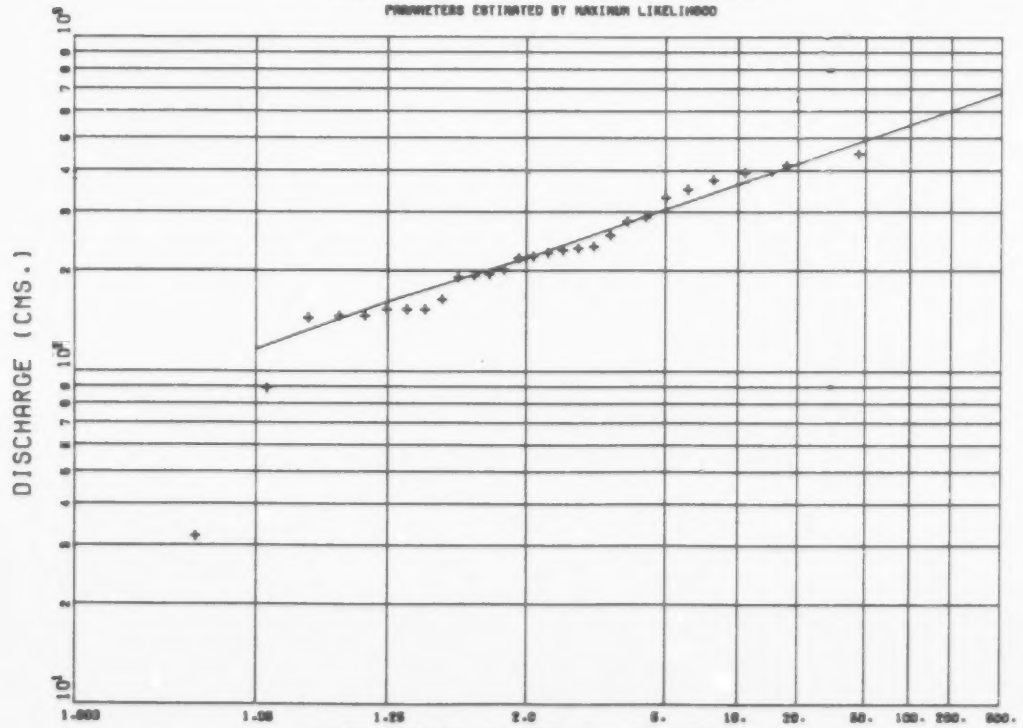
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	116.
1.250	.800	161.
2.000	.500	217.
2.330	.429	233.
5.000	.200	304.
10.000	.100	362.
20.000	.050	417.
50.000	.020	490.
100.000	.010	545.
200.000	.005	601.
500.000	.002	677.

NORTH THAMES RIVER NEAR MITCHELL 02GD014

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1237.0

NORTH THAMES RIVER NEAR THORNDALE 02GD015

DRAINAGE AREA : 1340.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1954 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	492.	182.	-.348	3.178
LN.X SERIES	6.10	.41	-1.509	5.872

X(MIN)= 97. CMS. TOTAL SAMPLE SIZE= 29
X(MAX)= 867. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

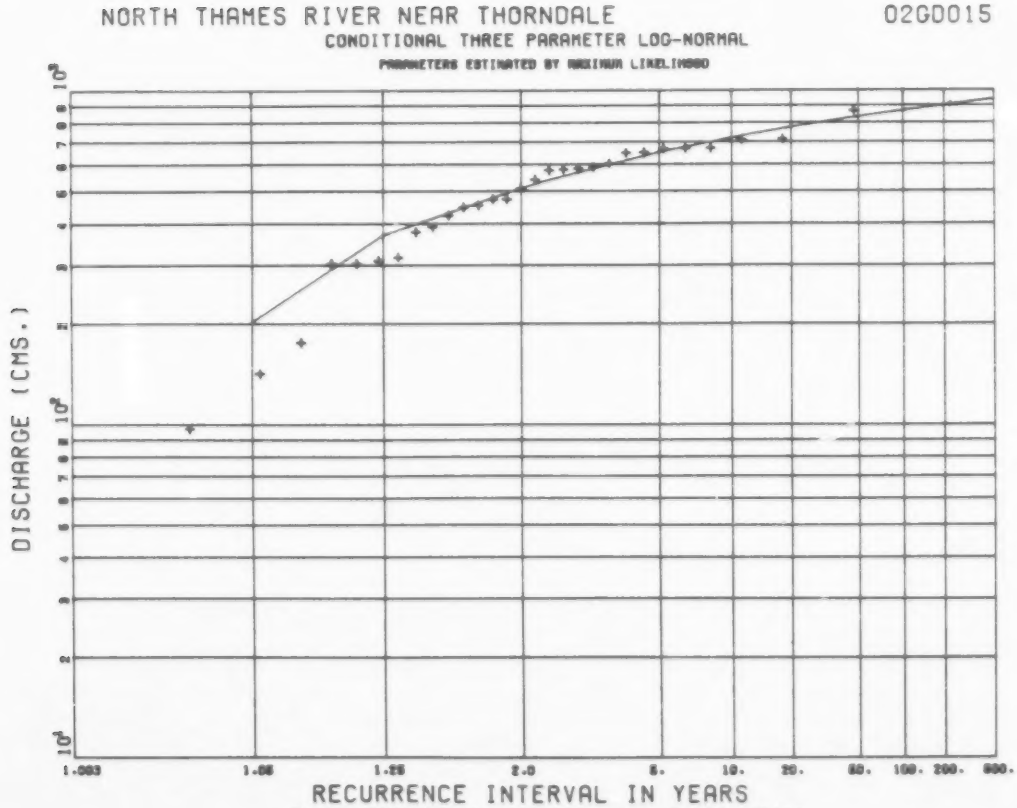
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	506.	174.	-.356	3.198
LN X SERIES	6.15	.42	-1.264	5.251
LN (X-A) SERIES	7.34	.11	-.014	3.296

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 2053.0924 M = 7.3381 S = .1121

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	282.
1.250	.800	368.
2.000	.500	508.
2.330	.429	539.
5.000	.200	650.
10.000	.100	718.
20.000	.050	772.
50.000	.020	830.
100.000	.010	867.
200.000	.005	899.
500.000	.002	934.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I250.0

NORTH WEST GANARASKA RIVER NEAR OSACA 02HD004

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 42.7 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1960 - 1982

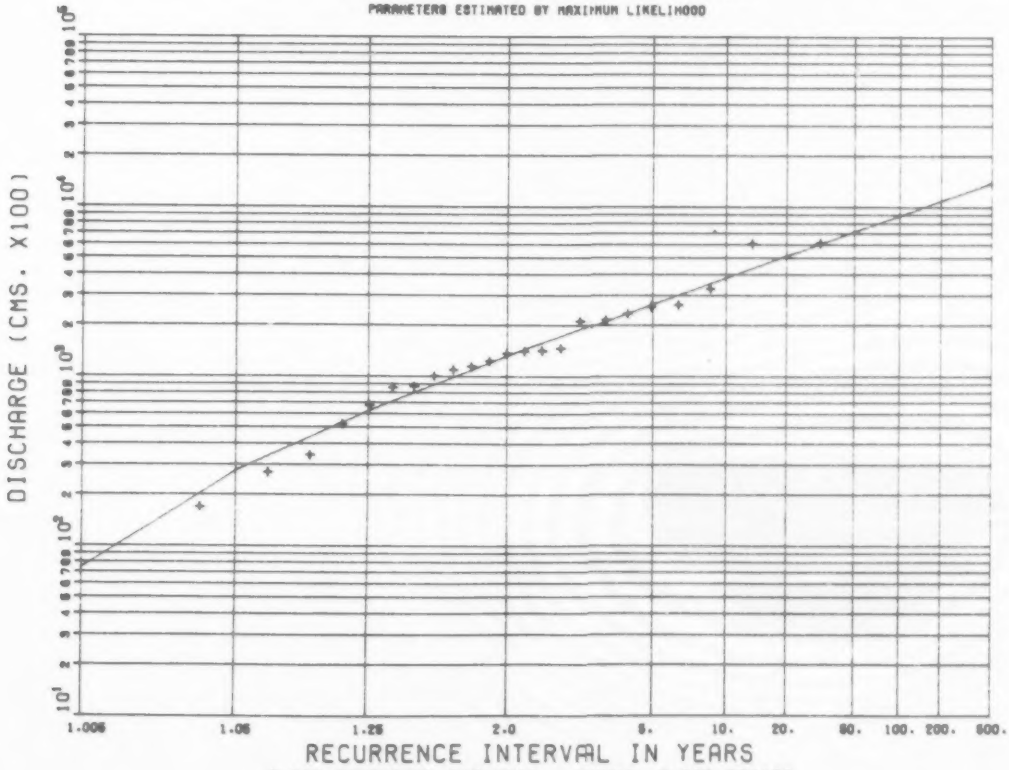
SAMPLE STATISTICS
MEAN = 1786. S.D. = 1582.3 C.S. = 1.8421 C.K. = 6.7953
SAMPLE STATISTICS (LOGS)
MEAN = 7.1413 S.D. = .8941 C.S. = -.3503 C.K. = 3.7094
SAMPLE MIN = 169. SAMPLE MAX = 6120. N = 23

PARAMETERS FOR GUMBEL I A = .001054 U = 1161.
PARAMETERS FOR LOGNORMAL M = 7.1413 S = .8941
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -111. M = 7.2586 S = .7911
STATISTICS OF LOG(X-A)
MEAN = 7.2586 S.D. = .7911 C.S. = -.0985 C.K. = 3.4800
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1611 B = .3081E+02 LOG(M) = 12.1037
ME= .1805E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1632 B = .2877E+02
LOG(M)E=11.8363 M = .1382E+06
DISTRIBUTION STATISTICS MEAN = 7.1413 S.D. = .8754 C.S. = -.3729

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-422.		126.		74.		37.		37.	
1.050	104.		290.		276.		274.		265.	
1.250	709.		535.		619.		617.		607.	
2.000	1510.		1250.		1320.		1330.		1330.	
2.330	1710.	14.70	1430.	18.8.	1520.	18.40	1550.	19.20	1560.	20.00
5.000	2580.	13.80	2690.	21.70	2650.	20.20	2670.	19.10	2710.	19.70
10.000	3300.	13.90	3970.	25.20	3900.	23.60	3720.	20.30	3820.	21.60
20.000	3980.	14.10	5500.	28.60	5110.	27.60	4830.	24.20	4990.	25.80
50.000	4850.	14.30	7920.	32.90	7100.	32.90	6380.	30.50	6640.	33.80
100.000	5530.	14.50	10100.	36.90	8830.	36.80	7610.	36.00	7970.	40.90
200.000	6190.	14.60	12600.	38.70	10800.	40.60	8890.	42.10	9360.	48.30
500.000	7060.	14.80	16600.	42.30	13800.	45.40	10700.	50.40	11300.	58.70

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT

NORTH WEST GANARASKA RIVER NEAR OSACA 02HD004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I:259.0

NORTHWEST TRIBUTARY TO LAKE 239 NEAR KENORA 05PD022

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

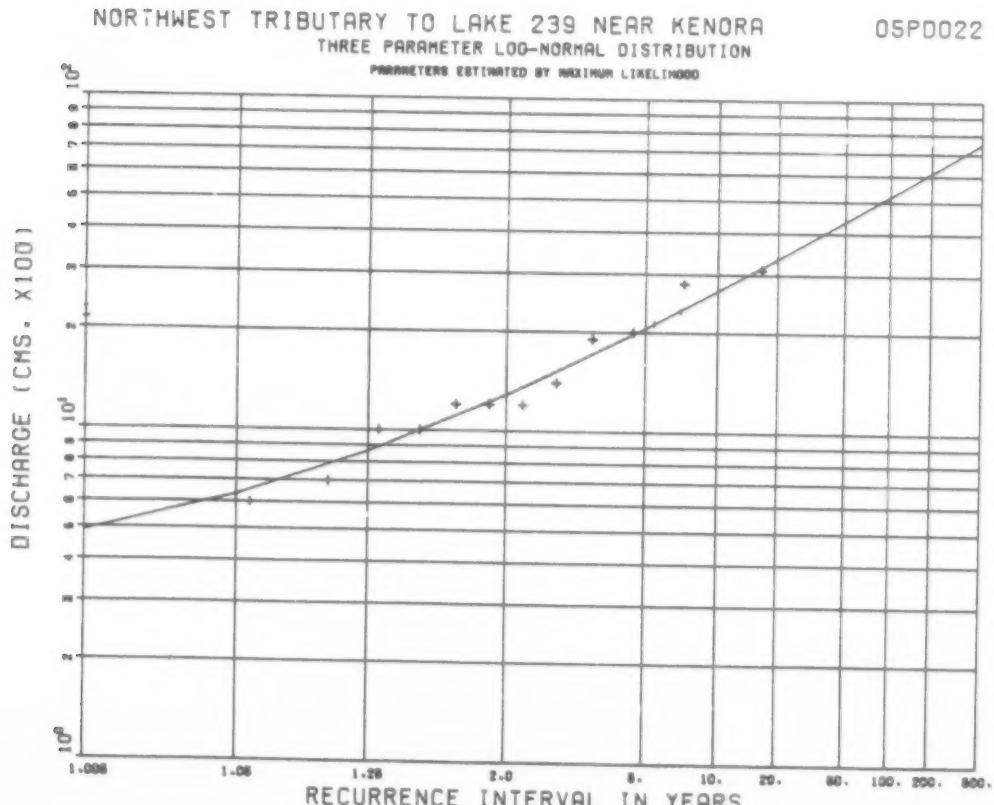
DRAINAGE AREA = .7 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1971 - 1982

SAMPLE STATISTICS
MEAN = 15. S.D. = 7.9 C.S. = 1.0426 C.K. = 4.2392
SAMPLE STATISTICS (LOGS)
MEAN = 2.5952 S.D. = .5051 C.S. = .2121 C.K. = 3.4877
SAMPLE MIN = 6. SAMPLE MAX = 31. N = 12

PARAMETERS FOR GUMBEL I A = .1313998 U = 12.
PARAMETERS FOR LOGNORMAL M = 2.5952 S = .5051
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 2.2553 S = .6997
STATISTICS OF LOG(X-A)
MEAN = 2.2550 S.D. = .6997 C.S. = -.1838 C.K. = 3.7162
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0536 B = .8998E+02 LOG(M) =-2.1668
ME= .1145E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1093 B = .2144E+02
LOG(M)F= .3365 M = .1400E+01
DISTRIBUTION STATISTICS MEAN = 2.5952 S.D. = .4878 C.S. = .4319

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	3.		4.		5.		5.		4.	
1.050	6.		6.		6.		6.		6.	
1.250	9.		9.		9.		9.		9.	
2.000	14.		13.		13.		13.		13.	
2.330	15.	13.40	15.	14.70	14.	16.20	14.	15.30	14.	16.00
5.000	20.	14.20	21.	17.00	21.	19.70	20.	18.30	20.	18.00
10.000	24.	15.20	26.	19.70	27.	24.60	26.	21.00	26.	22.00
20.000	28.	15.90	31.	22.40	33.	29.90	32.	23.20	32.	27.60
50.000	33.	16.80	38.	25.70	43.	37.20	41.	38.70	40.	36.70
100.000	37.	17.30	43.	28.10	52.	42.50	49.	46.60	47.	44.40
200.000	41.	17.70	49.	30.40	61.	47.70	57.	54.90	54.	52.60
500.000	46.	18.20	57.	33.10	75.	54.30	71.	66.40	65.	63.70

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I260.0

NOTTAWASAGA RIVER NEAR BAXTER 02ED003

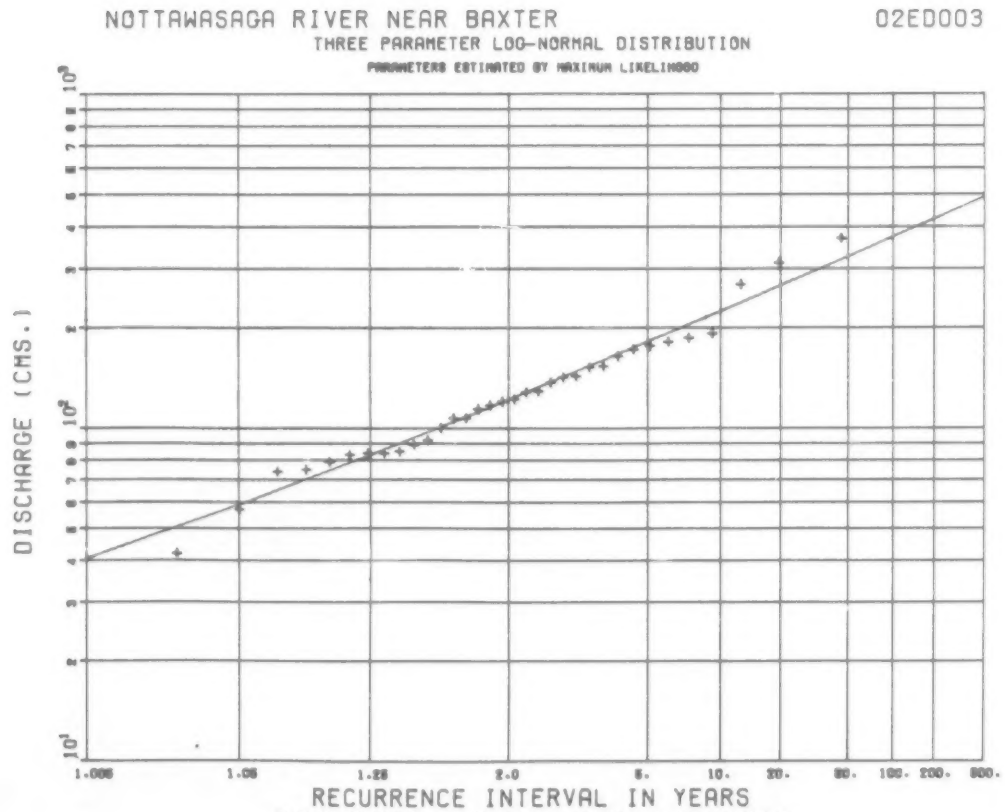
DRAINAGE AREA : 1180.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1949 - 1982

SAMPLE STATISTICS
MEAN = 136. S.D. = 69.8 C.S. = 1.7180 C.K. = 6.8514
SAMPLE STATISTICS (LOGS)
MEAN = 4.8089 S.D. = .4603 C.S. = .2353 C.K. = 3.7994
SAMPLE MIN = 42. SAMPLE MAX = 370. N = 34

PARAMETERS FOR GUMBEL I A = .021675 U = 108.
PARAMETERS FOR LOGNORMAL M = 4.8089 S = .4603
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. M = 4.7061 S = .5089
STATISTICS OF LOG(X-A)
MEAN = 4.7061 S.D. = .5089 C.S. = .0636 C.K. = 3.8758
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0542 B = .7224E+02 LOG(M) = .8967
ME= .2452E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0424 B = .1145E+03
LOG(M)F= -.0397 M = .9611E+00
DISTRIBUTION STATISTICS MEAN = 4.8089 S.D. = .4632 C.S. = .1869

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	31.		38.		41.		41.		41.	
1.010	56.		58.		59.		60.		59.	
1.050	86.		83.		81.		83.		83.	
1.100	102.		123.		121.		121.		120.	
2.000	134.	7.47	133.	7.96	132.	8.48	131.	8.46	131.	8.66
5.000	177.	8.06	181.	9.19	181.	9.56	179.	9.53	179.	9.80
10.000	212.	8.65	221.	10.70	223.	11.50	221.	11.60	223.	12.10
20.000	245.	9.14	261.	12.10	266.	13.90	264.	14.40	269.	15.10
50.000	288.	9.67	316.	13.90	325.	17.30	325.	19.30	334.	20.20
100.000	320.	10.00	358.	15.20	372.	19.90	374.	22.90	387.	24.40
200.000	352.	10.30	401.	16.40	421.	22.50	427.	26.30	444.	28.90
500.000	394.	10.60	462.	17.90	493.	25.70	502.	32.60	527.	35.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I261.0

O.A.C. FARM GAUGE NO. 5 AT GUELPH 02GA032

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 2.5 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 300. S.D. = 235.2 C.S. = 1.4840 C.K. = 6.2861
SAMPLE STATISTICS (LOGS)
MEAN = 5.3951 S.D. = .8798 C.S. = -.5736 C.K. = 4.3832
SAMPLE MIN = 33. SAMPLE MAX = 892. N = 13

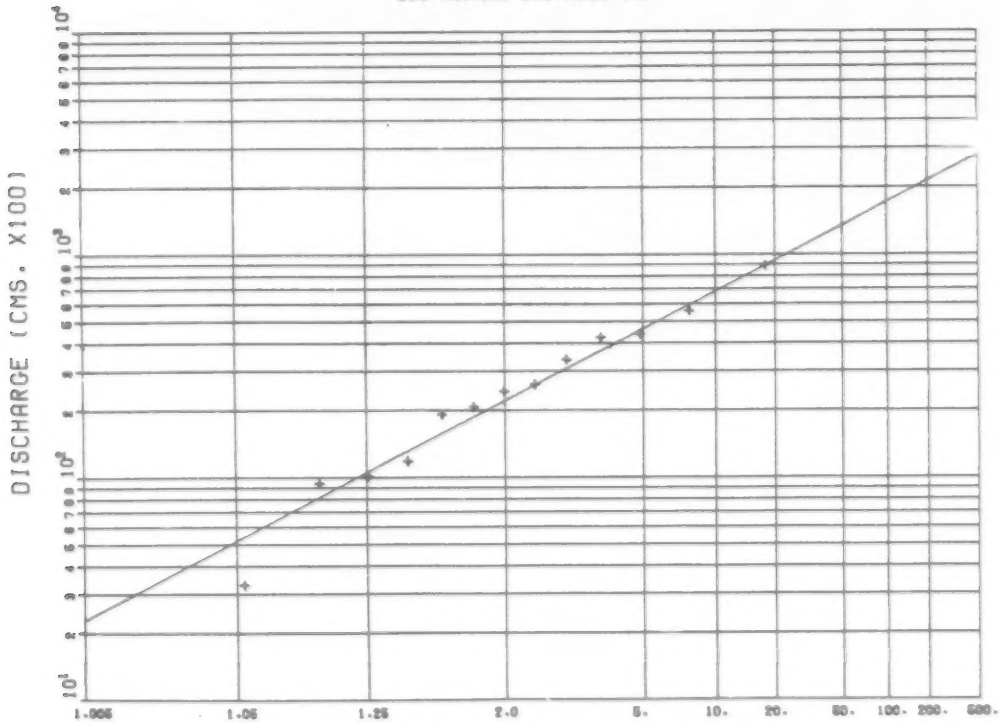
PARAMETERS FOR GUMBEL I A = .806372 U = 202.
PARAMETERS FOR LOGNORMAL M = 5.3951 S = .8798
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -38. M = 5.6033 S = .7053
STATISTICS OF LOG(X-A)
MEAN = 5.6033 S.D. = .7053 C.S. = -.1592 C.K. = 3.7320
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2823 B = .1216E+02 LOG(M) = 8.4629
ME= .4736E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3015 B = .8047E+01
LOG(M)F= 7.8218 M = .2494E+04
DISTRIBUTION STATISTICS MEAN = 5.3951 S.D. = .8554 C.S. = -.7050

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-60.		23.		6.		14.		14.	
1.050	27.		52.		47.		47.		46.	
1.250	127.		105.		112.		112.		109.	
2.000	259.		220.		234.		243.		239.	
2.330	292.	18.90	258.	24.60	270.	23.30	281.	23.70	279.	26.30
5.000	437.	16.00	462.	28.40	454.	24.70	458.	22.10	466.	24.00
10.000	555.	18.10	681.	32.90	632.	28.00	606.	22.30	636.	25.50
20.000	666.	18.40	937.	37.40	828.	33.60	744.	24.00	801.	30.90
50.000	814.	18.80	1340.	43.00	1120.	40.30	915.	28.20	1020.	41.90
100.000	923.	19.10	1710.	47.00	1360.	45.20	1040.	32.50	1180.	51.40
200.000	1030.	19.30	2120.	50.70	1630.	49.90	1150.	37.20	1330.	61.50
500.000	1180.	19.50	2780.	55.40	2030.	56.00	1290.	44.00	1540.	75.20

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT

O.A.C. FARM GAUGE NO. 5 AT GUELPH 02GA032

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I362.0

OAKVILLE CREEK AT MILTON 02HB005

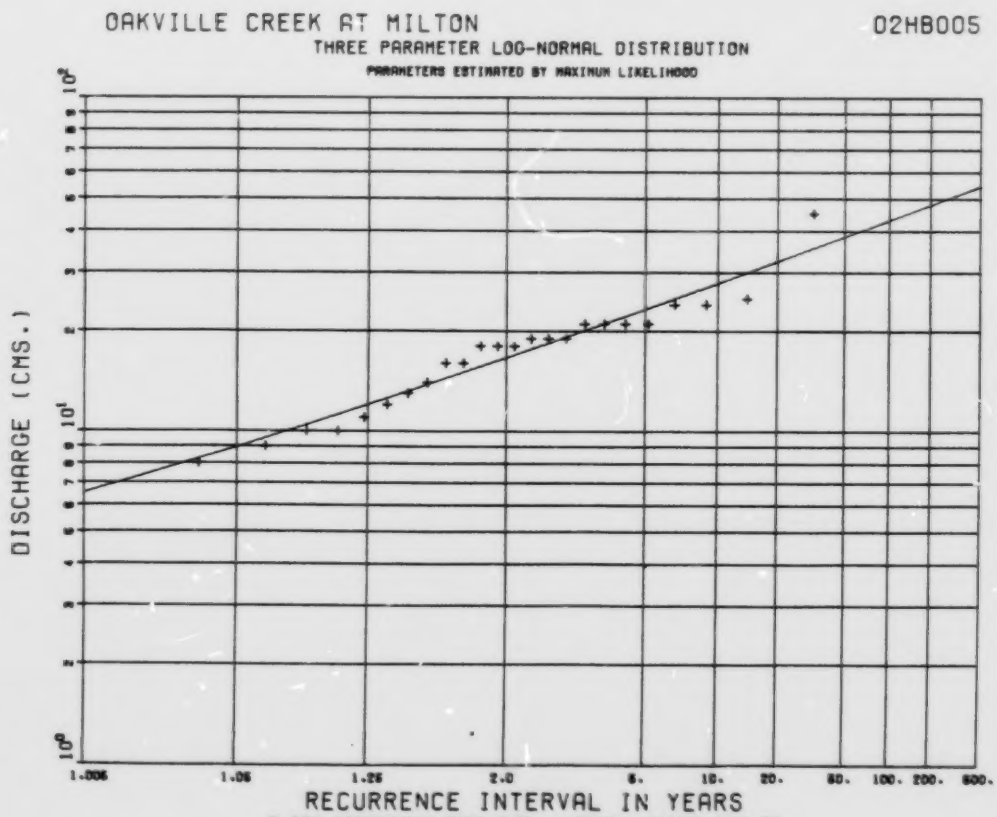
DRAINAGE AREA : 95.6 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1959 - 1982

SAMPLE STATISTICS
MEAN = 16. S.D. = 7.6 C.S. = 1.8351 C.K. = 9.5310
SAMPLE STATISTICS (LOGS)
MEAN = 2.8157 S.D. = .3910 C.S. = .1210 C.K. = 4.0189
SAMPLE MIN = 6. SAMPLE MAX = 45. N = 24

PARAMETERS FOR GUMBEL I A = .103943 U = 15.
PARAMETERS FOR LOGNORMAL M = 2.8157 S = .3910
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 2.6977 S = .4394
STATISTICS OF LOG(X-A)
MEAN = 2.6977 S.D. = .4394 C.S. = -.8205 C.K. = 3.8386
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0236 B = .2734E+03 LOG(P) =-3.6487
ME= .2602E-01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0203 B = .3556E+03
LOG(P)F=-4.4014 M = .1226E-01
DISTRIBUTION STATISTICS MEAN = 2.8157 S.D. = .3827 C.S. = .1061

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6.		6.		7.		6.		6.	
1.050	9.		9.		9.		9.		9.	
1.250	12.		12.		12.		12.		12.	
2.000	17.		17.		17.		17.		17.	
2.330	18.	7.84	18.	8.04	18.	8.60	18.	8.49	18.	8.69
5.000	23.	8.71	23.	9.29	23.	9.67	23.	9.39	23.	9.63
10.000	27.	9.48	28.	10.80	28.	11.70	27.	11.30	28.	11.60
20.000	31.	10.10	32.	12.20	32.	14.20	32.	13.90	32.	14.40
50.000	36.	10.80	37.	14.10	38.	17.80	38.	18.30	38.	19.00
100.000	40.	11.30	42.	15.40	43.	20.60	42.	22.30	43.	22.80
200.000	44.	11.60	46.	16.60	48.	23.30	47.	25.90	48.	26.90
500.000	49.	12.00	52.	18.10	54.	26.90	53.	31.30	55.	32.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1263.0

OGOKI RIVER ABOVE WHITECLAY LAKE 04GB004

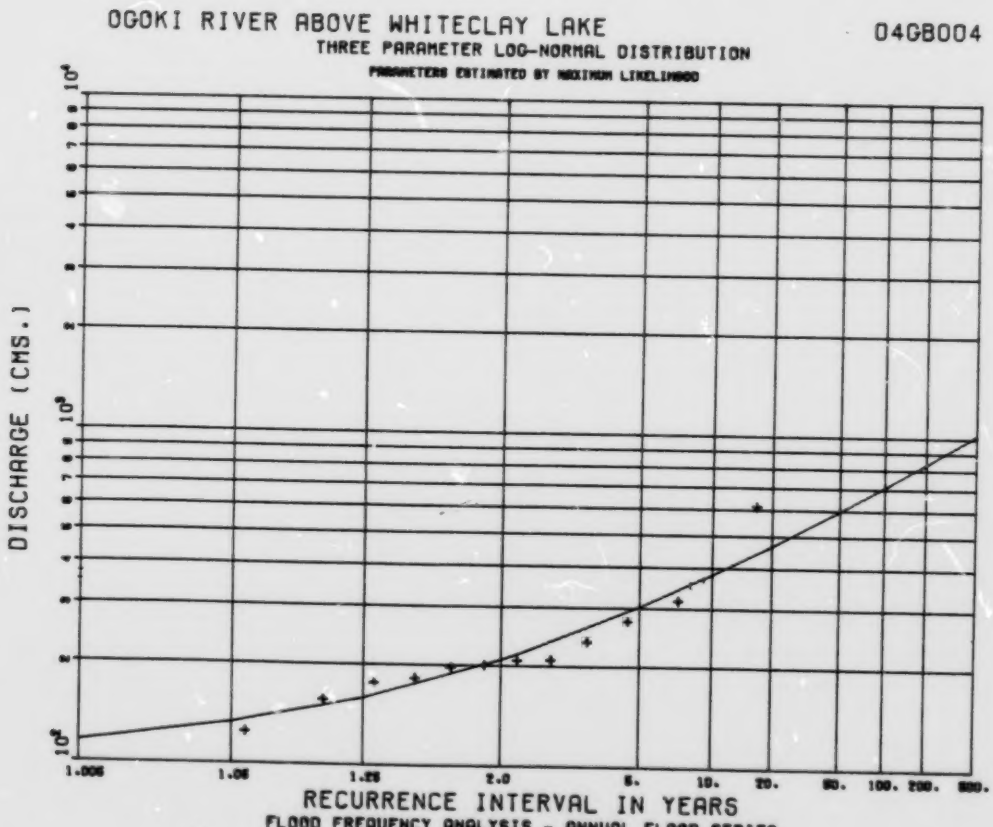
DRAINAGE AREA = 11280.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1983

SAMPLE STATISTICS
MEAN = 241. S.D. = 128.0 C.S. = 2.5626 C.K. = 11.5811
SAMPLE STATISTICS (LOGS)
MEAN = 5.3975 S.D. = .4046 C.S. = 1.4335 C.K. = 7.3039
SAMPLE MIN = 124. SAMPLE MAX = 614. N = 12

PARAMETERS FOR GUMBEL I A = .015265 U = 196.
PARAMETERS FOR LOGNORMAL M = 5.3975 S = .4046
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 99. M = 4.6927 S = .7398
STATISTICS OF LOG(X-A)
MEAN = 4.6927 S.D. = .7398 C.S. = .1545 C.K. = 5.8685
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2980 B = .1946E+01 LOG(M) = 4.8330
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1256E+03
A = .1814 B = .4322E+01
LOG(M)F= 4.6134 M = .1008E+03
DISTRIBUTION STATISTICS MEAN = 5.3975 S.D. = .3772 C.S. = .9620

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	87.		78.		115.		116.		0.	
1.050	123.		114.		132.		134.		0.	
1.250	165.		157.		156.		160.		0.	
2.000	220.		221.		208.		208.		0.	
5.330	294.	10.30	307.	11.80	294.	12.40	292.	11.40	0.	0.00
10.000	343.	11.60	361.	13.60	343.	16.70	344.	15.60	0.	0.00
20.000	393.	12.70	421.	15.80	391.	21.90	395.	20.80	0.	0.00
50.000	457.	13.70	498.	17.90	467.	27.60	466.	26.90	0.	0.00
100.000	497.	14.70	547.	20.60	527.	35.20	523.	35.80	0.	0.00
200.000	543.	15.40	596.	22.50	588.	40.90	586.	42.90	0.	0.00
500.000	603.	15.90	626.	24.30	832.	46.40	818.	50.30	0.	0.00
	603.	16.50	708.	26.50	1020.	53.50	1030.	60.50	0.	0.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I264.0

OSHAWA CREEK AT OSHAWA 02HD008

DRAINAGE AREA : 95.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1960 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	45.	32.	1.585	7.217
LN X SERIES	3.56	.77	-.819	5.557

X(MIN)= 4. CMS. TOTAL SAMPLE SIZE= 23
X(MAX)= 145. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	47.	31.	1.683	7.513
LN X SERIES	3.66	.62	.110	3.625
LN (X-A) SERIES	3.56	.68	-.053	3.749

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 2.9119 M = 3.5648 S = .6767

FLOOD FREQUENCY REGIME

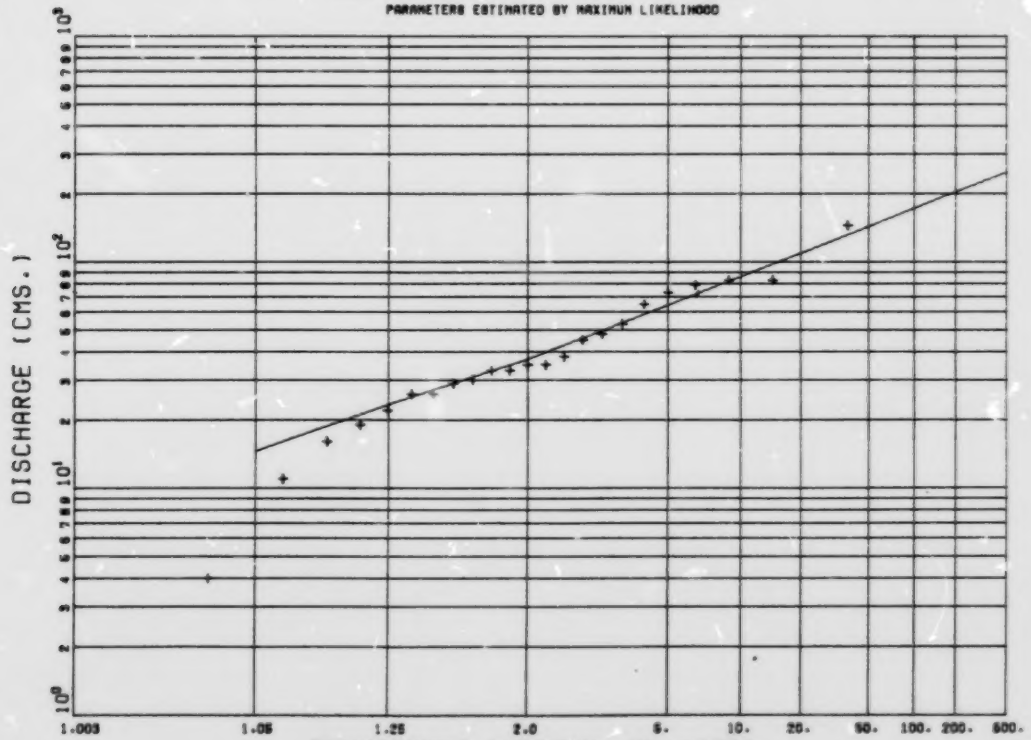
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	15.
1.250	.800	23.
2.000	.500	37.
2.330	.429	42.
5.000	.200	64.
10.000	.100	86.
20.000	.050	109.
50.000	.020	143.
100.000	.010	172.
200.000	.005	203.
500.000	.002	248.

OSHAWA CREEK AT OSHAWA 02HD008

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I265.0

OTONABEE RIVER AT LAKEFIELD 02HJ002

DRAINAGE AREA : 7360.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1966 - 1982

SAMPLE STATISTICS
MEAN = 315. S.D. = 67.9 C.S. = -.4951 C.K. = 4.0948
SAMPLE STATISTICS (LOGS)
MEAN = 5.7271 S.D. = .2390 C.S. = -1.0398 C.K. = 4.2617
SAMPLE MIN = 183. SAMPLE MAX = 447. N = 17

PARAMETERS FOR GUMBEL I A = .014509 U = 280.
PARAMETERS FOR LOGNORMAL M = 5.7271 S = .2390

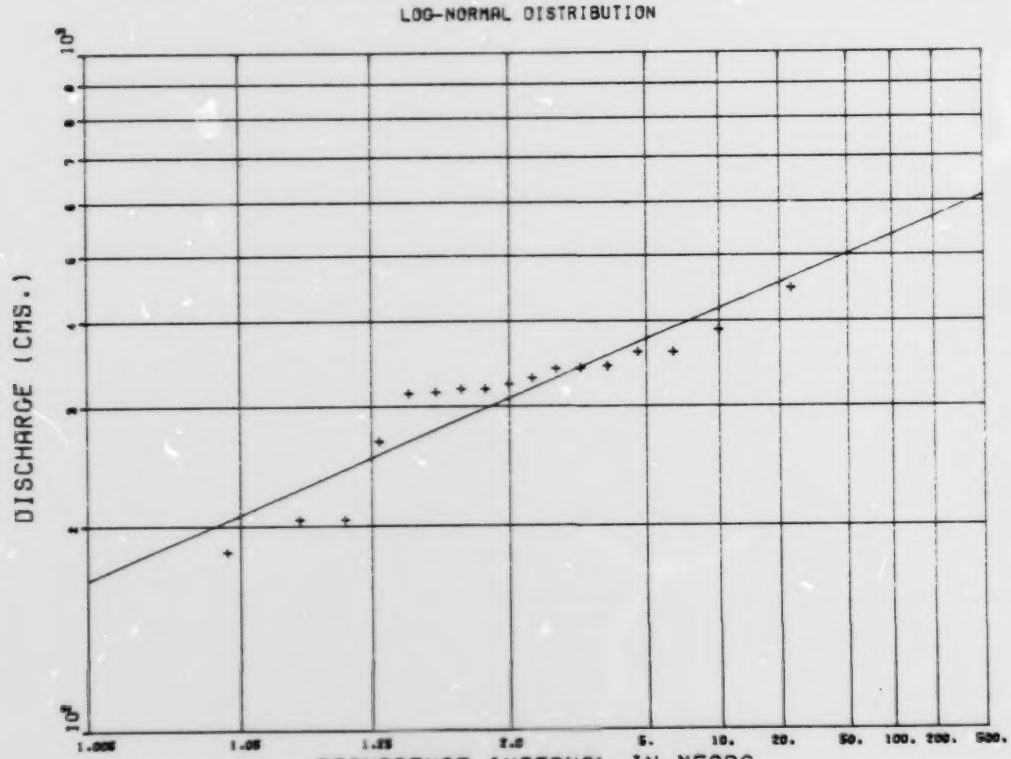
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1243 B = .3700E+01 LOG(M) = 6.1864
ME= .4863E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1714 B = .5229E+01
LOG(M)E= 6.2373 M = .5115E+03
DISTRIBUTION STATISTICS MEAN = 5.7271 S.D. = .2275 C.S. = -.8918

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	165.		166.		0.		141.		132.	
1.050	204.		207.		0.		201.		196.	
1.250	248.		251.		0.		258.		257.	
2.000	306.		307.		0.		317.		321.	
2.330	320.	6.52	320.	5.84	0.	0.00	330.	5.30	332.	6.38
5.000	384.	7.85	376.	6.75	0.	0.00	373.	4.75	376.	4.73
10.000	436.	8.87	417.	7.82	0.	0.00	399.	4.58	401.	5.19
20.000	485.	9.74	455.	8.89	0.	0.00	418.	4.66	420.	7.39
50.000	549.	10.70	502.	10.20	0.	0.00	438.	5.15	437.	11.16
100.000	597.	11.30	535.	11.20	0.	0.00	450.	5.75	447.	13.90
200.000	645.	11.80	568.	12.07	0.	0.00	459.	6.47	455.	16.70
500.000	709.	12.40	611.	13.20	0.	0.00	470.	7.52	463.	20.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

OTONABEE RIVER AT LAKEFIELD 02HJ002

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I266.0

OTOSKWIN RIVER BELOW BADESDAWA LAKE 04FA001

DRAINAGE AREA : 9010.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 309. S.D. = 122.8 C.S. = 1.8896 C.K. = 5.9887
SAMPLE STATISTICS (LOGS)
MEAN = 5.6505 S.D. = .3888 C.S. = .8849 C.K. = 3.5116
SAMPLE MIN = 165. SAMPLE MAX = 612. N = 13

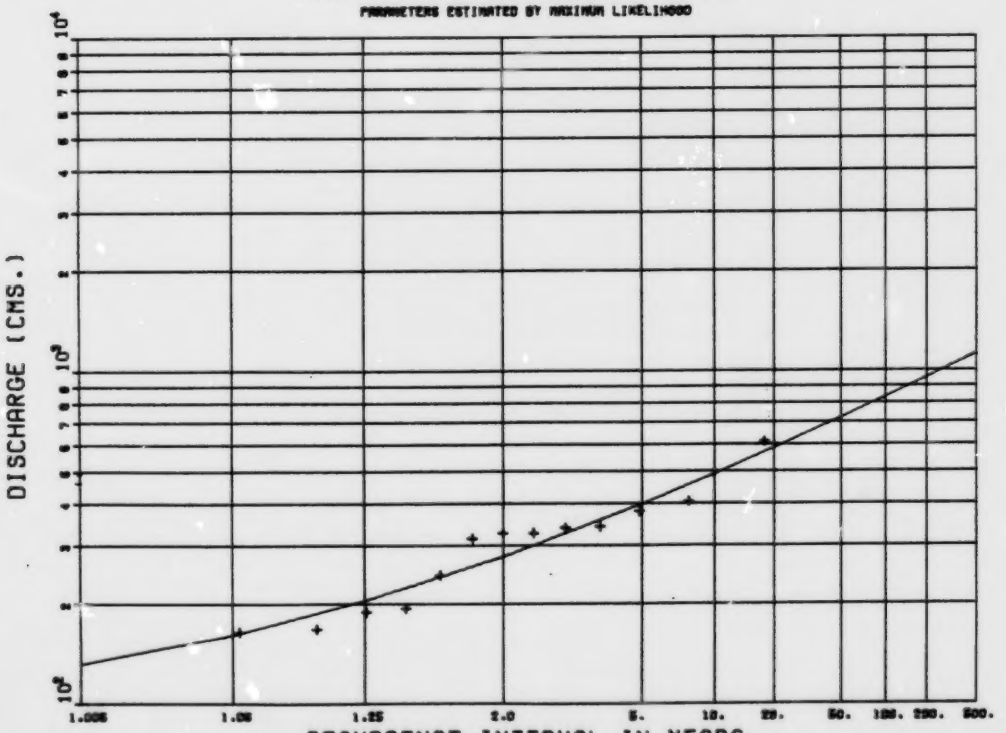
PARAMETERS FOR GUMBEL I A = .010967 U = 254.
PARAMETERS FOR LOGNORMAL M = 5.6595 S = .3888
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 90. M = 5.2334 S = .5909
STATISTICS OF LOG(X-A)
MEAN = 5.2334 S.D. = .5909 C.S. = -.2417 C.K. = 3.1473
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8165 B = .3555E+03 LOG(M) =-3.4994
ME= .3022E-01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	102.		105.		131.		0.		109.	
1.050	153.		151.		161.		0.		153.	
1.250	211.		207.		204.		0.		207.	
2.000	288.		287.		277.		0.		285.	
2.330	307.	10.50	308.	10.90	298.	12.00	0.	0.00	306.	11.70
5.000	391.	11.70	398.	12.50	398.	14.80	0.	0.00	397.	12.90
10.000	459.	12.70	472.	14.60	489.	18.20	0.	0.00	474.	15.40
20.000	525.	13.60	544.	16.50	585.	23.00	0.	0.00	549.	19.00
50.000	610.	14.60	638.	19.00	721.	29.10	0.	0.00	643.	25.00
100.000	674.	15.20	709.	20.80	830.	33.70	0.	0.00	726.	30.10
200.000	737.	15.70	781.	22.40	948.	38.20	0.	0.00	806.	35.40
500.000	821.	16.20	879.	24.50	1120.	44.10	0.	0.00	915.	42.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

OTOSKWIN RIVER BELOW BADESDAWA LAKE 04FA001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I267.0

OTTAWA RIVER AT DES JOACHIMS 02KA002

DRAINAGE AREA : 57500.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1951 - 1982

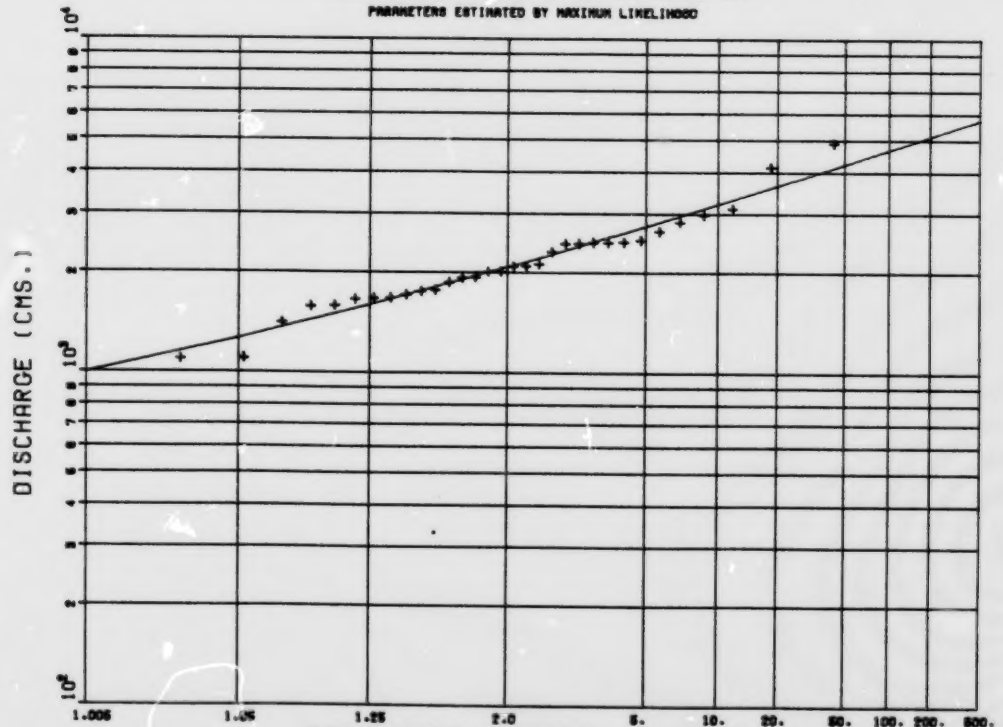
SAMPLE STATISTICS
MEAN = 2210. S.D. = 786.7 C.S. = 1.6619 C.K. = 7.3032
SAMPLE STATISTICS (LOGS)
MEAN = 7.6481 S.D. = .3226 C.S. = .3911 C.K. = 4.3124
SAMPLE MIN = 1092. SAMPLE MAX = 4896. N = 32

PARAMETERS FOR GUMBEL I A = .001800 U = 1881.
PARAMETERS FOR LOGNORMAL M = 7.6481 S = .3226
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 410. M = 7.4148 S = .4048
STATISTICS OF LOG(X-A)
MEAN = 7.4148 S.D. = .4048 C.S. = .0751 C.K. = 4.2177
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0631 B = .2615E+02 LOG(M) = 5.9982
ME= .4027E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0426 B = .5528E+02
LOG(M)F= 5.2926 M = .1989E+03
DISTRIBUTION STATISTICS MEAN = 7.6481 S.D. = .3168 C.S. = .2690

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	954.		913.		995.		1000.		1030.	
1.050	1260.		1230.		1260.		1260.		1280.	
1.250	1620.		1600.		1590.		1600.		1590.	
2.000	2080.		2100.		2070.		2070.		2050.	
2.330	2200.	5.66	2220.	5.75	2190.	6.19	2190.	6.09	2170.	6.34
5.000	2710.	6.52	2750.	6.64	2740.	7.08	2720.	7.81	2730.	7.35
10.000	3130.	7.25	3170.	7.70	3200.	8.66	3170.	8.62	3210.	9.23
20.000	3530.	7.87	3560.	8.75	3640.	10.60	3610.	10.80	3690.	11.90
50.000	4050.	8.53	4070.	10.10	4220.	13.40	4200.	14.30	4340.	16.10
100.000	4440.	8.95	4440.	11.00	4670.	15.70	4660.	17.20	4870.	19.70
200.000	4825.	9.30	4810.	11.90	5120.	17.90	5140.	20.30	5420.	23.40
500.000	5330.	9.71	5310.	12.90	5740.	20.50	5800.	24.50	6200.	28.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

OTTAWA RIVER AT DES JOACHIMS 02KA002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I268.0

T-383

OTTAWA RIVER AT LA CAVE RAPIDS 02JE012

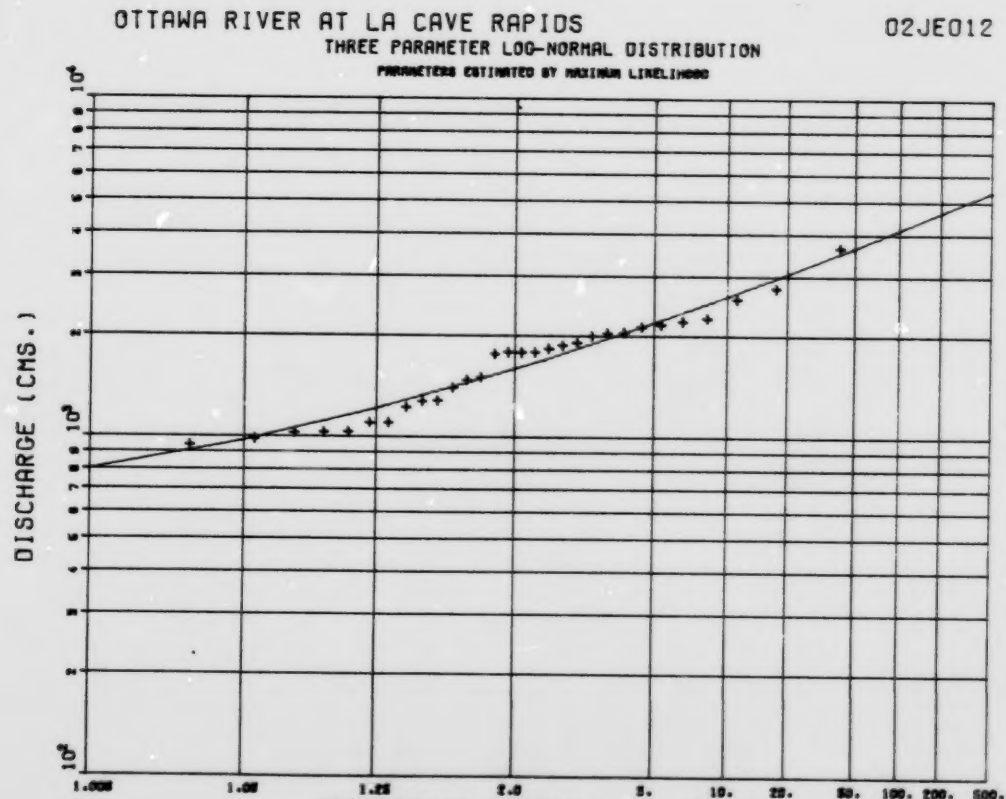
DRAINAGE AREA : 47300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1953 - 1982

SAMPLE STATISTICS
MEAN = 1731. S.D. = 615.5 C.S. = 1.0213 C.K. = 5.1456
SAMPLE STATISTICS (LOGS)
MEAN = 7.3985 S.D. = .3451 C.S. = .1123 C.K. = 2.7950
SAMPLE MIN = 941. SAMPLE MAX = 3653. N = 30

PARAMETERS FOR GUMBEL I A = .002123 U = 1455.
PARAMETERS FOR LOGNORMAL M = 7.3985 S = .3451
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 521. M = 6.9716 S = .5248
STATISTICS OF LOG(X-A)
MEAN = 6.9716 S.D. = .5248 C.S. = -.1851 C.K. = 2.5295
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0194 B = .3172E+03 LOG(M) = 1.2513
ME= .3435E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0478 B = .5091E+02
LOG(M)= 4.9666 M = .1435E+03
DISTRIBUTION STATISTICS MEAN = 7.3985 S.D. = .3408 C.S. = .2803

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	669.		671.		796.		742.		696.	
1.050	930.		926.		970.		959.		936.	
1.250	1230.		1220.		1210.		1220.		1221.	
2.000	1630.		1630.		1590.		1610.		1620.	
2.330	1730.	6.32	1740.	6.35	1690.	7.00	1710.	6.77	1730.	6.86
5.000	2160.	7.17	2180.	7.33	2180.	8.49	2160.	7.80	2180.	7.59
10.000	2510.	7.91	2540.	8.51	2610.	10.70	2550.	9.61	2550.	9.10
20.000	2850.	8.52	2880.	9.67	3050.	13.20	2940.	12.10	2910.	11.30
50.000	3290.	9.19	3320.	11.10	3650.	16.80	3460.	16.30	3390.	14.90
100.000	3620.	9.60	3650.	12.10	4130.	19.60	3870.	19.20	3750.	17.90
200.000	3950.	9.95	3970.	13.10	4640.	22.30	4300.	23.60	4120.	21.10
500.000	4380.	10.30	4410.	14.30	5350.	25.90	4900.	27.40	4630.	25.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I269.0

OUSE RIVER NEAR WESTWOOD 02HJ003

DRAINAGE AREA : 282.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 44. S.D. = 16.2 C.S. = .4148 C.K. = 2.8152
SAMPLE STATISTICS (LOGS)
MEAN = 3.7232 S.D. = .3732 C.S. = -.0127 C.K. = 2.7679
SAMPLE MIN = 23. SAMPLE MAX = 68. N = 12

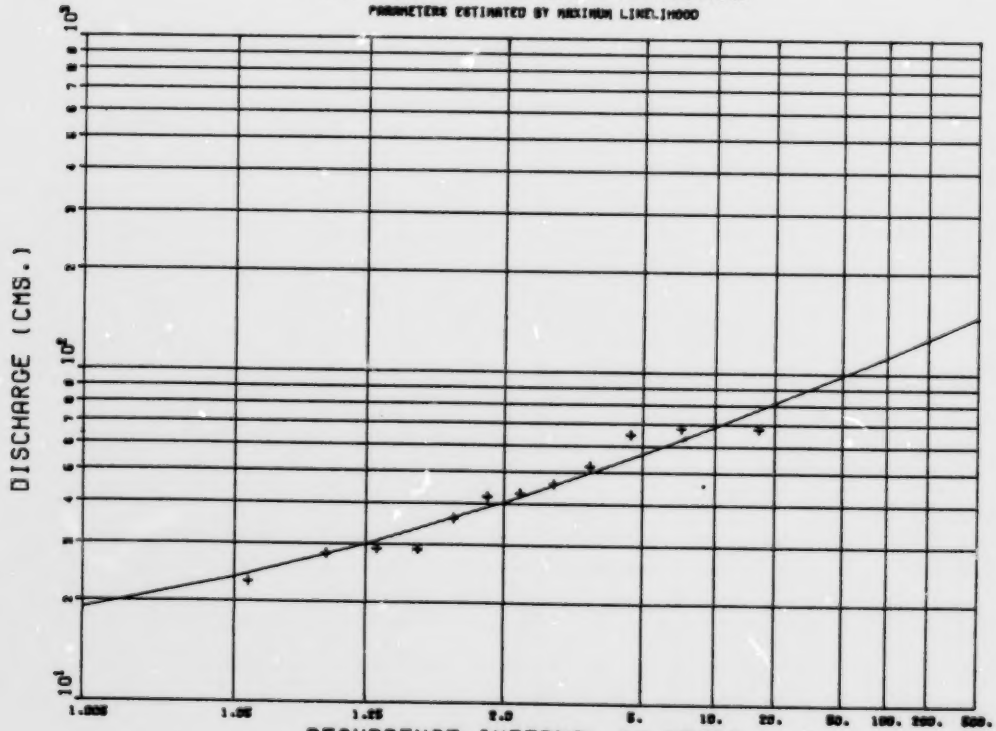
PARAMETERS FOR GUMBEL I A = .079390 U = 37.
PARAMETERS FOR LOGNORMAL M = 3.7232 S = .3732
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 12. M = 3.3348 S = .5471
STATISTICS OF LOG(X-A)
MEAN = 3.3348 S.D. = .5471 C.S. = -.2377 C.K. = 2.9563
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0124 B = .2482E+05 LOG(M) =62.5146
ME= .1412E+28

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	16.		16.		19.		0.		16.	
1.050	23.		22.		24.		0.		22.	
1.250	31.		30.		30.		0.		30.	
2.000	41.		41.		40.		0.		41.	
2.330	44.	10.50	44.	10.90	43.	12.00	0.	0.00	44.	11.70
5.000	56.	11.80	57.	12.50	57.	14.40	0.	0.00	57.	12.60
10.000	65.	12.90	67.	14.50	69.	18.10	0.	0.00	67.	14.70
20.000	74.	13.90	77.	16.50	81.	22.30	0.	0.00	76.	18.00
50.000	86.	14.90	89.	19.00	99.	28.20	0.	0.00	89.	23.50
100.000	95.	15.50	99.	20.70	112.	32.80	0.	0.00	98.	28.20
200.000	103.	16.10	108.	22.40	127.	37.30	0.	0.00	108.	33.10
500.000	115.	16.70	121.	24.40	144.	43.10	0.	0.00	121.	40.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

OUSE RIVER NEAR WESTWOOD 02HJ003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1270.0

OTTAWA RIVER NEAR TIMISKAMING 02JE003

DRAINAGE AREA = 46100.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1912 - 1951

SAMPLE STATISTICS
MEAN = 2004. S.D. = 596.2 C.S. = .4922 C.K. = 3.1587
SAMPLE STATISTICS (LOGS)
MEAN = 7.5592 S.D. = .3024 C.S. = -.1474 C.K. = 2.6334
SAMPLE MIN = 1001. SAMPLE MAX = 3542. N = 40

PARAMETERS FOR GUMBEL I A = .002004 U = 1723.
PARAMETERS FOR LOGNORMAL M = 7.5592 S = .3024
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -298. M = 7.7090 S = .2601
STATISTICS OF LOG(X-A)
MEAN = 7.7090 S.D. = .2601 C.S. = -.0647 C.K. = 2.6134
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0223 B = .1842E+03 LOG(P) =11.6626
ME= .1161E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0413 B = .5258E+02
LOG(P)F= 9.7305 M = .1683E+05
DISTRIBUTION STATISTICS MEAN = 7.5592 S.D. = .2994 C.S. = -.2758

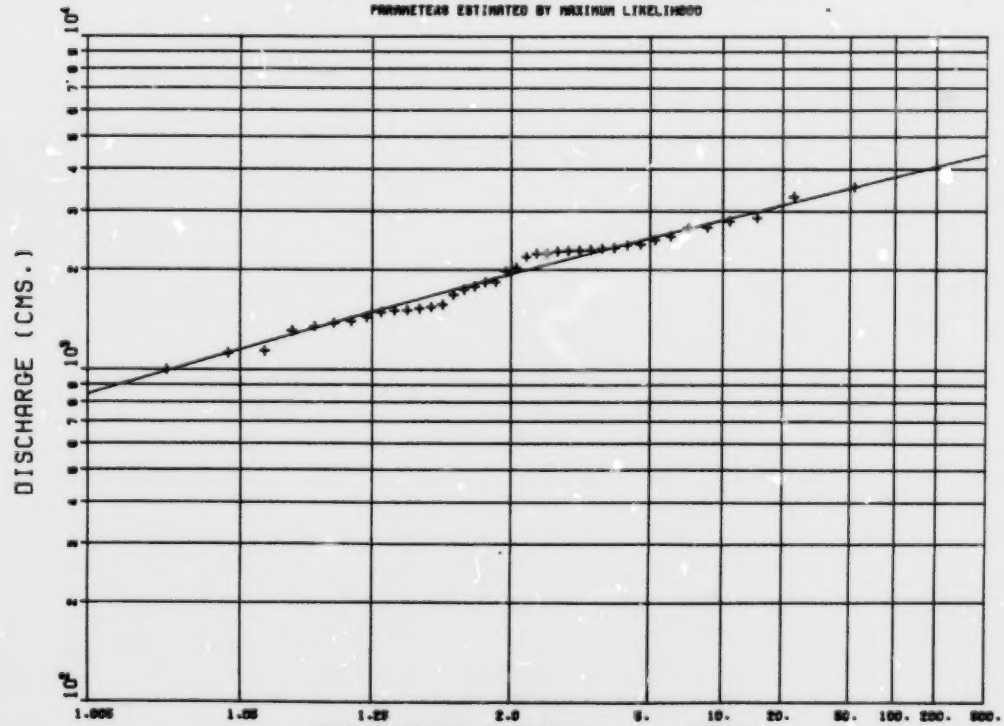
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	890.		880.		842.		821.		844.	
1.050	1170.		1170.		1150.		1150.		1150.	
1.250	1490.		1490.		1490.		1500.		1490.	
2.000	1910.		1920.		1930.		1940.		1930.	
2.330	2010.	4.98	2020.	4.82	2040.	5.05	2050.	5.07	2040.	5.15
5.000	2470.	5.75	2470.	5.56	2480.	5.37	2480.	5.12	2480.	5.37
10.000	2850.	6.41	2830.	6.45	2810.	6.30	2790.	5.70	2810.	6.14
20.000	3200.	6.96	3150.	7.33	3120.	7.58	3060.	6.72	3110.	7.42
50.000	3670.	7.56	3570.	8.43	3500.	9.62	3390.	8.57	3480.	9.63
100.000	4020.	7.94	3880.	9.20	3780.	11.00	3620.	10.20	3750.	11.50
200.000	4370.	8.26	4180.	9.93	4060.	12.60	3840.	11.90	4010.	13.60
500.000	4820.	8.62	4580.	10.80	4410.	14.70	4120.	14.30	4340.	16.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

OTTAWA RIVER NEAR TIMISKAMING 02JE003

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1271.0

PAGWACHUAN RIVER AT HIGHWAY NO. 11 04JD005

DRAINAGE AREA = 2020.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1968 - 1982

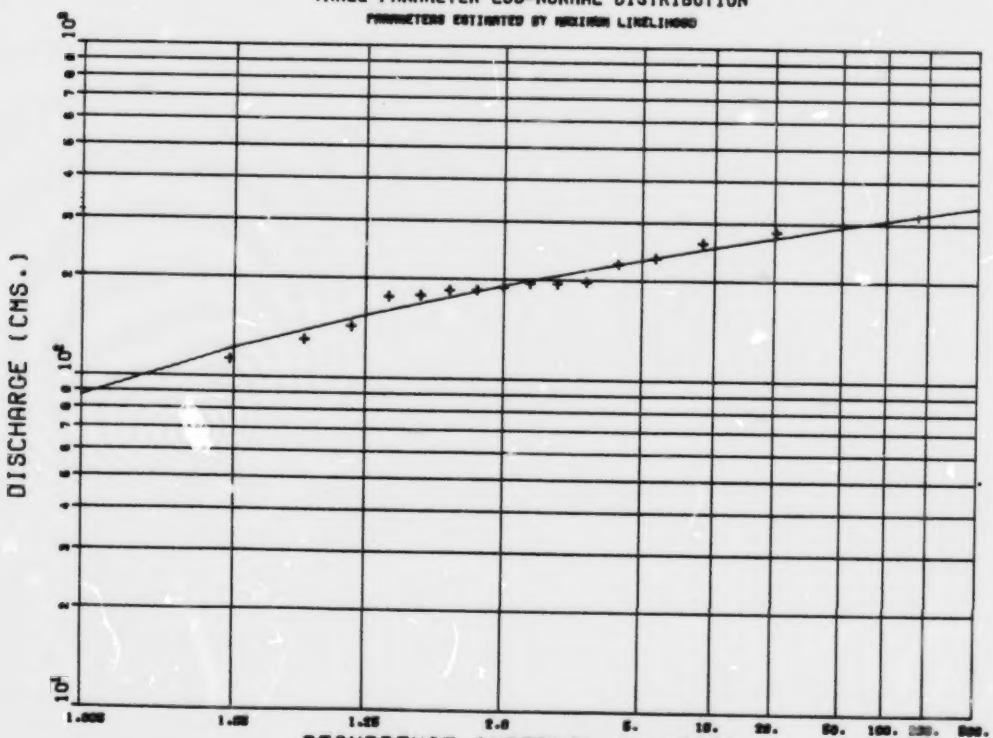
SAMPLE STATISTICS
MEAN = 192. S.D. = 45.2 C.S. = .2269 C.K. = 3.9606
SAMPLE STATISTICS (LOGS)
MEAN = 5.2331 S.D. = .2436 C.S. = -.4445 C.K. = 4.1060
SAMPLE MIN = 113. SAMPLE MAX = 282. N = 15

PARAMETERS FOR GUMBEL I A = .024707 U = 171.
PARAMETERS FOR LOGNORMAL M = 5.2331 S = .2436
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -340. M = 6.2749 S = .0847
STATISTICS OF LOG(X-A)
MEAN = 6.2749 S.D. = .0847 C.S. = -.0085 C.K. = 3.9094
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0541 B = .2025E+02 LOG(M) = 6.3292
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .5607E+03
A = -.0581 B = .1653E+02
LOG(M)= 6.1935 M = .4896E+03
DISTRIBUTION STATISTICS MEAN = 5.2331 S.D. = .2362 C.S. = -.4919

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	107.		100.		87.		91.		9[illegible].	
1.250	126.		126.		122.		123.		122.	
1.250	152.		153.		154.		155.		154.	
2.000	186.		187.		191.		191.		191.	
2.330	194.	6.82	196.	6.34	199.	6.41	199.	6.31	199.	6.76
5.000	232.	8.13	230.	7.32	230.	6.34	229.	6.15	231.	6.46
10.000	262.	9.22	256.	8.49	252.	7.10	250.	6.52	252.	6.99
20.000	291.	10.10	280.	9.65	270.	8.34	267.	7.39	271.	8.38
50.000	329.	11.20	309.	11.10	292.	10.30	286.	9.13	291.	11.10
100.000	357.	11.80	330.	12.10	306.	12.00	298.	10.70	305.	13.50
200.000	385.	12.40	351.	13.10	320.	13.60	309.	12.40	317.	16.00
500.000	423.	13.00	378.	14.30	337.	15.80	323.	14.90	333.	19.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PAGWACHUAN RIVER AT HIGHWAY NO. 11 04JD005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I272.0

PARKHILL CREEK ABOVE PARKHILL RESERVOIR 02FF008

DRAINAGE AREA = 11[illegible].0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 34. S.D. = 6.3 C.S. = .3558 C.K. = 3.0675
SAMPLE STATISTICS (LOGS)
MEAN = 3.5229 S.D. = .1831 C.S. = .1654 C.K. = 2.8665
SAMPLE MIN = 27. SAMPLE MAX = 45. N = 10

PARAMETERS FOR GUMBEL I A = .202464 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5229 S = .1831

NO MAXIMUM LIKELIHOOD SOLUTION FOR THREE PARAMETER LOGNORMAL

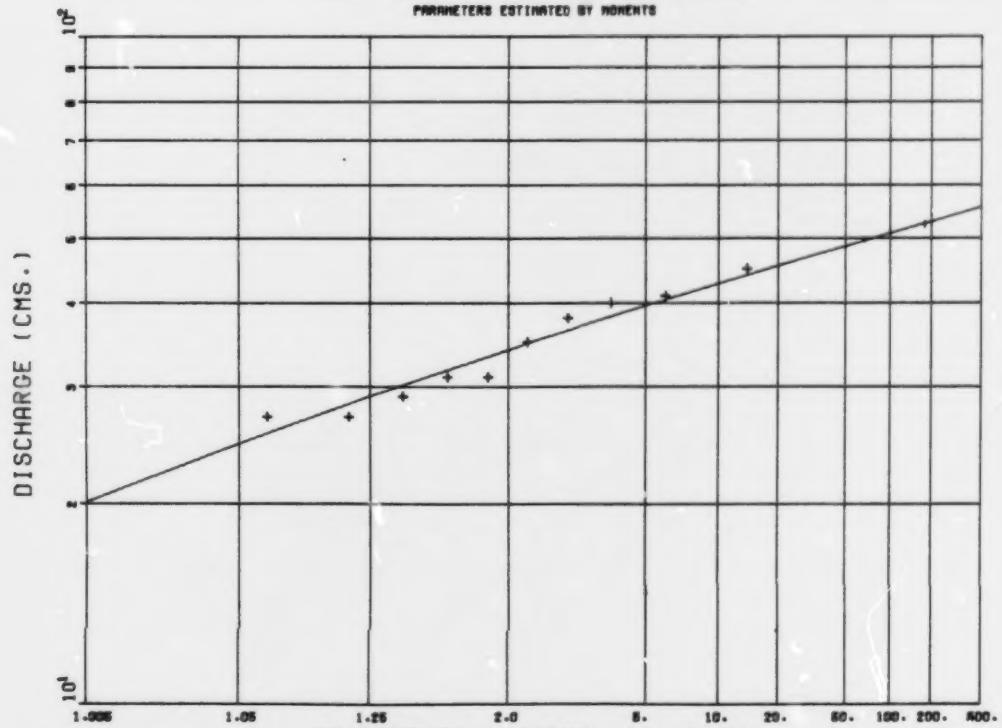
PARAMETERS FOR THREE PARAMETER LOG NORMAL BY MOMENTS A = -.1936E+02 M = 3.9776 S = .1176
STATISTICS OF LOG(X-A)
MEAN = 3.9763 S.D. = .1170 C.S. = .2324 C.K. = 2.9192
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0151 B = .1463E+03 LOG(M) = 1.3081
ME= .3699E+01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	23.		21.		20.		0.		22.	
1.050	28.		25.		23.		0.		25.	
1.250	29.		29.		29.		0.		29.	
2.000	33.		34.		34.		0.		34.	
2.330	34.	5.77	35.	5.84	35.	6.30	0.	0.00	35.	6.32
5.000	39.	7.23	40.	6.74	40.	6.47	0.	0.00	40.	7.07
10.000	43.	8.47	43.	7.82	43.	7.48	0.	0.00	43.	8.56
20.000	46.	9.57	46.	8.88	45.	9.05	0.	0.00	46.	10.70
50.000	51.	10.80	49.	10.20	49.	11.40	0.	0.00	50.	14.10
100.000	54.	11.60	52.	11.10	51.	13.70	0.	0.00	53.	17.10
200.000	58.	12.40	54.	12.00	53.	15.80	0.	0.00	56.	20.10
500.000	62.	13.20	57.	13.10	56.	18.70	0.	0.00	60.	24.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PARKHILL CREEK ABOVE PARKHILL RESERVOIR 02FF008
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MOMENTS



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I273.0

PARKHILL CREEK NEAR PARKHILL 02FF003

DRAINAGE AREA = 124.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1954 - 1967

SAMPLE STATISTICS
MEAN = 69. S.D. = 45.4 C.S. = .6717 C.K. = 3.2945
SAMPLE STATISTICS (LOGS)
MEAN = 3.9968 S.D. = .7565 C.S. = -.3741 C.K. = 2.9883
SAMPLE MIN = 15. SAMPLE MAX = 156. N = 14

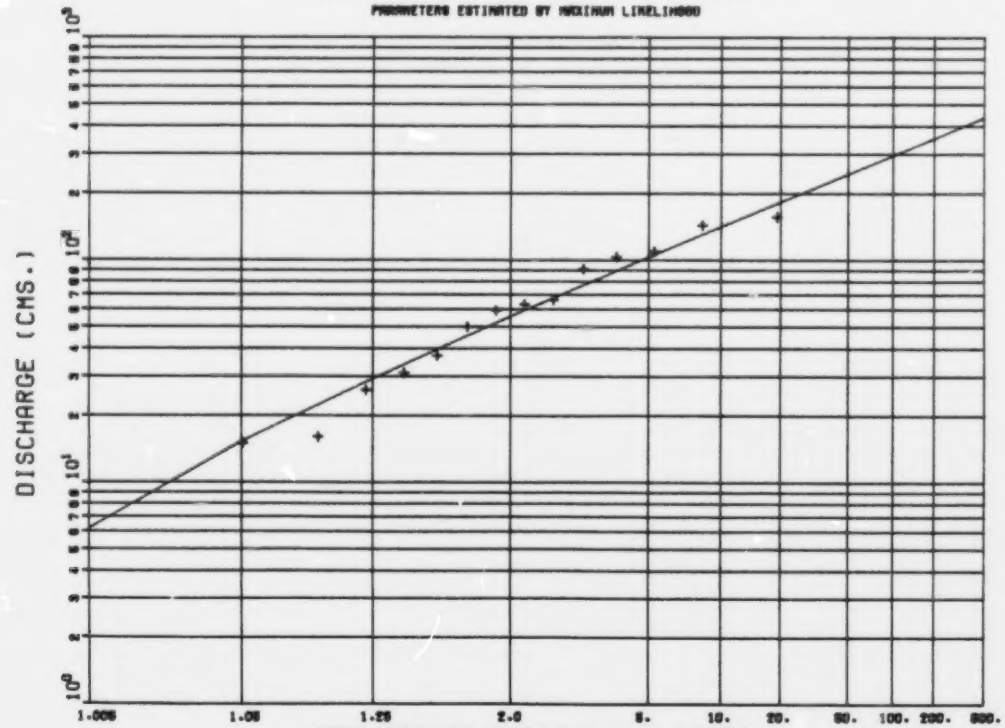
PARAMETERS FOR GUMBEL I A = .029391 U = 49.
PARAMETERS FOR LOGNORMAL M = 3.9968 S = .7565
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -4. M = 4.0795 S = .6957
STATISTICS OF LOG(X-A)
MEAN = 4.0798 S.D. = .6957 C.S. = -.2896 C.K. = 2.9042
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1415 B = .2857E+02 LOG(M) = 8.0405
ME= .3104E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-8.		0.		6.		0.		6.	
1.050	11.		16.		15.		0.		15.	
1.250	32.		29.		29.		0.		29.	
2.000	61.		54.		56.		0.		57.	
2.330	68.	16.90	62.	20.40	63.	20.60	0.	0.00	65.	21.70
5.000	100.	16.50	103.	23.50	103.	22.40	0.	0.00	104.	21.20
10.000	125.	16.80	144.	27.30	141.	26.50	0.	0.00	136.	23.30
20.000	150.	17.20	189.	31.00	182.	31.20	0.	0.00	173.	27.80
50.000	181.	17.60	257.	35.70	243.	37.60	0.	0.00	226.	36.50
100.000	205.	17.90	316.	38.90	295.	42.40	0.	0.00	257.	44.10
200.000	229.	18.20	382.	42.00	351.	47.00	0.	0.00	294.	52.20
500.000	260.	18.40	481.	45.90	435.	52.90	0.	0.00	344.	63.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PARKHILL CREEK NEAR PARKHILL 02FF003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I274.0

PATTERSON CREEK NEAR SIMCOE 02GC012

DRAINAGE AREA : 51.3 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1964 - 1982

SAMPLE STATISTICS MEAN = 5. S.D. = 2.7 C.S. = 1.9255 C.K. = 9.5856
SAMPLE STATISTICS (LOGS) MEAN = 1.5140 S.D. = .4963 C.S. = -.0473 C.K. = 4.0186
SAMPLE MIN = 2. SAMPLE MAX = 14. N = 19

PARAMETERS FOR GUMBEL I A = .538866 U = 4.
PARAMETERS FOR LOGNORMAL M = 1.5140 S = .4963
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = .2132 S = 2.2508
STATISTICS OF LOG(X-A) MEAN = .2132 S.D. = 2.2508 C.S. = -1.7749 C.K. = 5.3803
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0117 B = .1789E+04 LOG(M) =22.5069
ME= .5951E+10
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0099 B = .2371E+04
LOG(M)= 25.0342 M = .7451E+11

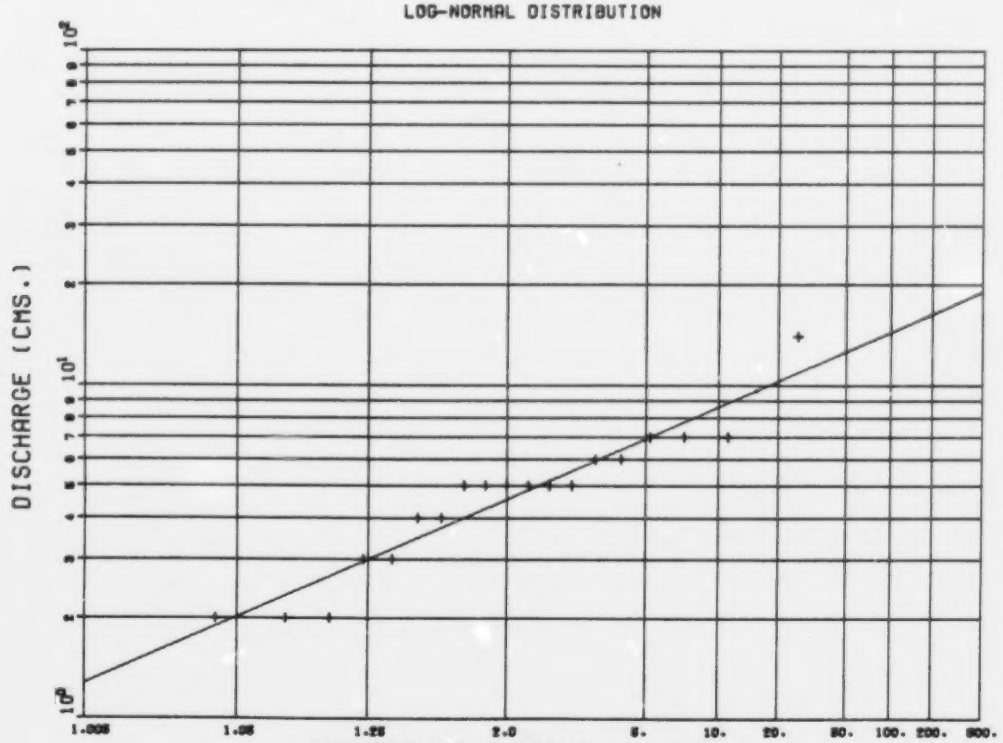
DISTRIBUTION STATISTICS MEAN = 1.5140 S.D. = .4830 C.S. = -.0411

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		1.		2.		1.		1.	
1.050	2.		2.		2.		2.		2.	
1.250	3.		3.		3.		3.		3.	
2.000	5.		5.		5.		5.		5.	
2.330	5.	18.70	5.	11.50	4.	25.10	5.	12.00	5.	12.30
5.000	7.	11.30	7.	13.30	10.	48.40	7.	12.80	7.	13.20
10.000	8.	12.00	9.	15.40	24.	64.00	8.	15.00	9.	15.30
20.000	10.	12.70	10.	17.50	52.	76.30	10.	18.20	10.	18.70
50.000	11.	13.30	12.	20.10	128.	89.80	12.	23.70	12.	24.30
100.000	13.	13.70	14.	21.90	234.	98.80	14.	28.40	14.	29.10
200.000	14.	14.10	16.	23.70	410.	107.00	16.	33.40	16.	34.20
500.000	16.	14.50	19.	25.80	811.	117.00	18.	40.30	18.	41.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PATTERSON CREEK NEAR SIMCOE 02GC012

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I275.0

PEFFERLAW BROOK NEAR UDORA 02EC103

DRAINAGE AREA = 332.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1970 - 1982

SAMPLE STATISTICS
MEAN = 46. S.D. = 17.7 C.S. = -.1965 C.K. = 2.7258
SAMPLE STATISTICS (LOGS)
MEAN = 3.7352 S.D. = .4467 C.S. = -.6693 C.K. = 3.0572
SAMPLE MIN = 20. SAMPLE MAX = 70. N = 13

PARAMETERS FOR GUMBEL I A = .063378 U = 37.
PARAMETERS FOR LOGNORMAL M = 3.7352 S = .4467

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1495 B = .8929E+01 LOG(M) = 5.8701
ME= .1592E+03

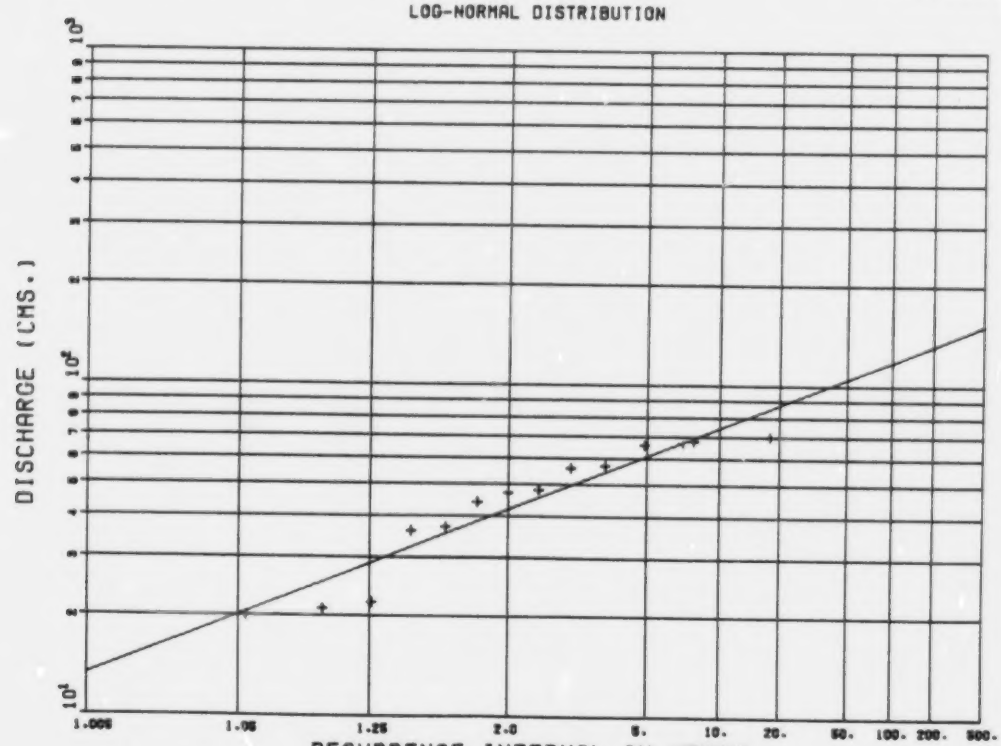
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	11.		13.		0.		0.		10.	
1.050	19.		20.		0.		0.		19.	
1.250	30.		29.		0.		0.		29.	
2.000	43.		42.		0.		0.		44.	
5.000	46.	12.00	45.	12.50	0.	0.00	0.	0.00	48.	13.40
10.000	61.	13.00	61.	14.40	0.	0.00	0.	0.00	61.	11.80
20.000	73.	14.00	74.	16.70	0.	0.00	0.	0.00	71.	12.40
50.000	84.	14.80	87.	19.00	0.	0.00	0.	0.00	80.	15.30
100.000	90.	15.60	105.	21.80	0.	0.00	0.	0.00	89.	21.20
200.000	110.	16.10	118.	23.80	0.	0.00	0.	0.00	95.	26.30
500.000	121.	16.60	132.	25.70	0.	0.00	0.	0.00	101.	31.60
	135.	17.10	152.	28.10	0.	0.00	0.	0.00	107.	38.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PEFFERLAW BROOK NEAR UDORA 02EC103

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I276.0

PERCH LAKE INLET NO. 1 NEAR CHALK RIVER 02KA004

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA = .9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1973 - 1982

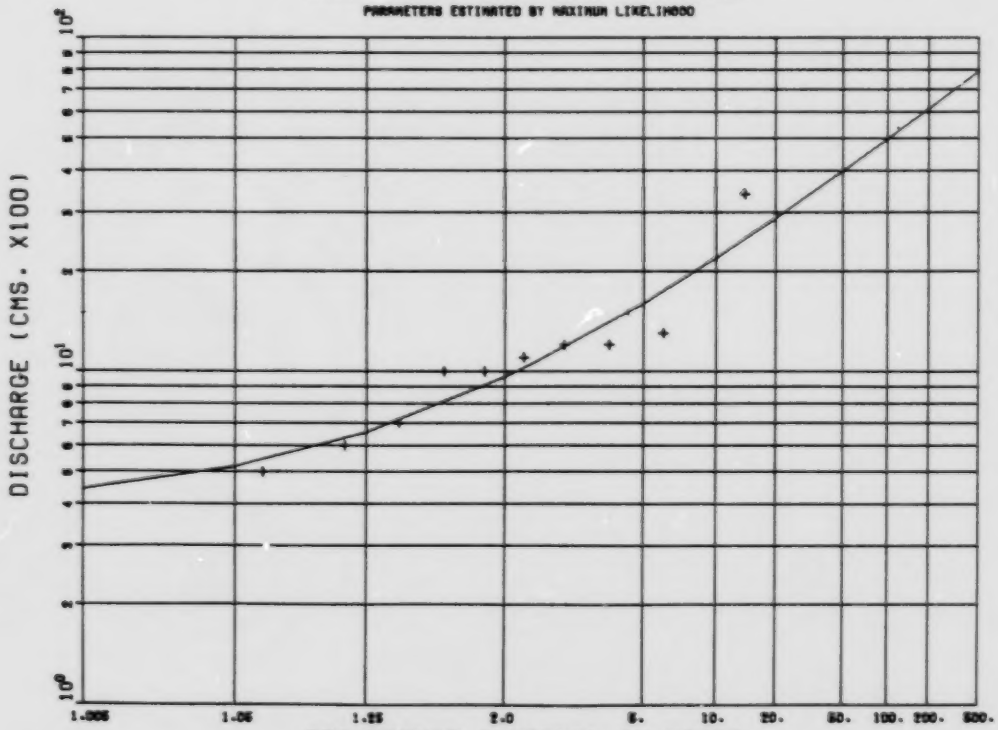
SAMPLE STATISTICS
MEAN = 12. S.D. = 8.2 C.S. = 2.5131 C.K. = 11.5629
SAMPLE STATISTICS (LOGS)
MEAN = 2.3411 S.D. = .5266 C.S. = 1.0139 C.K. = 6.7516
SAMPLE MIN = 5. SAMPLE MAX = 34. N = 10

PARAMETERS FOR GUMBEL I A = .235740 U = 9.
PARAMETERS FOR LOGNORMAL P = 2.3411 S = .5266
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 4. M = 1.7465 S = .8936
STATISTICS OF LOG(X-A)
MEAN = 1.7465 S.D. = .8936 C.S. = -.1067 C.K. = 5.2750
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2662 B = .3914E+01 LOG(M) = 1.2933
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3667E+01
A = .2484 B = .4213E+01
LOG(M)F= 1.2946 M = .3650E+01
DISTRIBUTION STATISTICS MEAN = 2.3411 S.D. = .5098 C.S. = .9743

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	2.		3.		4.		4.		4.	
1.050	4.		4.		5.		5.		5.	
1.250	7.		7.		7.		7.		7.	
2.000	11.		10.		10.		10.		10.	
2.330	12.	14.70	11.	16.80	11.	18.60	11.	16.80	10.	20.30
5.000	16.	15.60	16.	17.40	15.	25.00	15.	23.20	15.	24.50
10.000	19.	16.60	20.	25.50	22.	32.60	21.	31.00	21.	32.90
20.000	22.	17.50	25.	25.50	29.	39.70	27.	40.00	28.	46.00
50.000	26.	18.40	31.	29.40	40.	49.40	38.	53.10	40.	67.90
100.000	29.	19.00	35.	32.10	50.	56.20	48.	63.70	51.	86.70
200.000	32.	19.40	41.	34.60	61.	63.00	61.	74.70	66.	107.00
500.000	36.	19.90	47.	37.80	75.	71.30	84.	89.80	92.	136.00

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

PERCH LAKE INLET NO. 1 NEAR CHALK RIVER 02KA004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1277.0

PERCH LAKE INLET NO. 2 NEAR CHALK RIVER 02KA005

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 3.4 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1960 - 1983

SAMPLE STATISTICS
MEAN = 36. S.D. = 8.2 C.S. = -.0810 C.K. = 2.6803
SAMPLE STATISTICS (LOGS)
MEAN = 3.5635 S.D. = .2359 C.S. = -.4262 C.K. = 2.8852
SAMPLE MIN = 23. SAMPLE MAX = 48. N = 16

PARAMETERS FOR GUMBEL I A = .136564 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5635 S = .2359

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0500 B = .2223E+02 LOG(M) = 4.6758
ME= .1873E+03

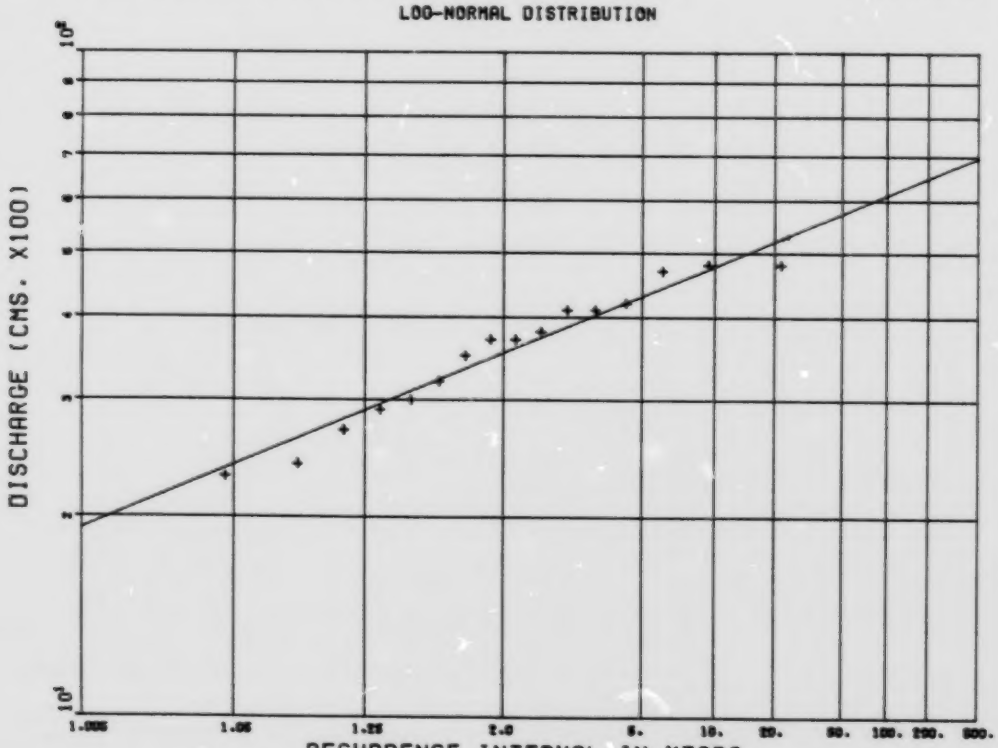
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	20.		19.		0.		0.		18.	
1.050	24.		24.		0.		0.		23.	
1.250	29.		29.		0.		0.		29.	
2.000	35.		35.		0.		0.		36.	
2.330	37.	6.37	37.	5.94	0.	0.00	0.	0.00	37.	6.33
5.000	43.	7.63	43.	6.86	0.	0.00	0.	0.00	43.	6.18
10.000	49.	8.69	48.	7.96	0.	0.00	0.	0.00	47.	6.62
20.000	54.	9.59	52.	9.05	0.	0.00	0.	0.00	51.	7.93
50.000	61.	10.60	57.	10.40	0.	0.00	0.	0.00	54.	10.50
100.000	66.	11.20	61.	11.40	0.	0.00	0.	0.00	57.	12.70
200.000	71.	11.80	65.	12.30	0.	0.00	0.	0.00	59.	15.10
500.000	78.	12.40	70.	13.40	0.	0.00	0.	0.00	62.	18.30

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

PERCH LAKE INLET NO. 2 NEAR CHALK RIVER 02KA005

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I278.0

PERCH LAKE INLET NO. 3 NEAR CHALK RIVER 02KA006

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : .8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1982

SAMPLE STATISTICS
MEAN = 8. S.D. = 2.6 C.S. = .8113 C.K. = 4.4087
SAMPLE STATISTICS (LOGS)
MEAN = 2.0728 S.D. = .3891 C.S. = .1418 C.K. = 3.5405
SAMPLE MIN = 5. SAMPLE MAX = 14. N = 13

PARAMETERS FOR GUMBEL I A = .499758 U = 7.
PARAMETERS FOR LOGNORMAL M = 2.0728 S = .3891
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = .2742 S = 2.3163
STATISTICS OF LOG(X-A)
MEAN = .2742 S.D. = 2.3163 C.S. = -1.8941 C.K. = 6.3917
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8218 B = .2013E+03 LOG(M) =-2.3125
ME= .9901E-01

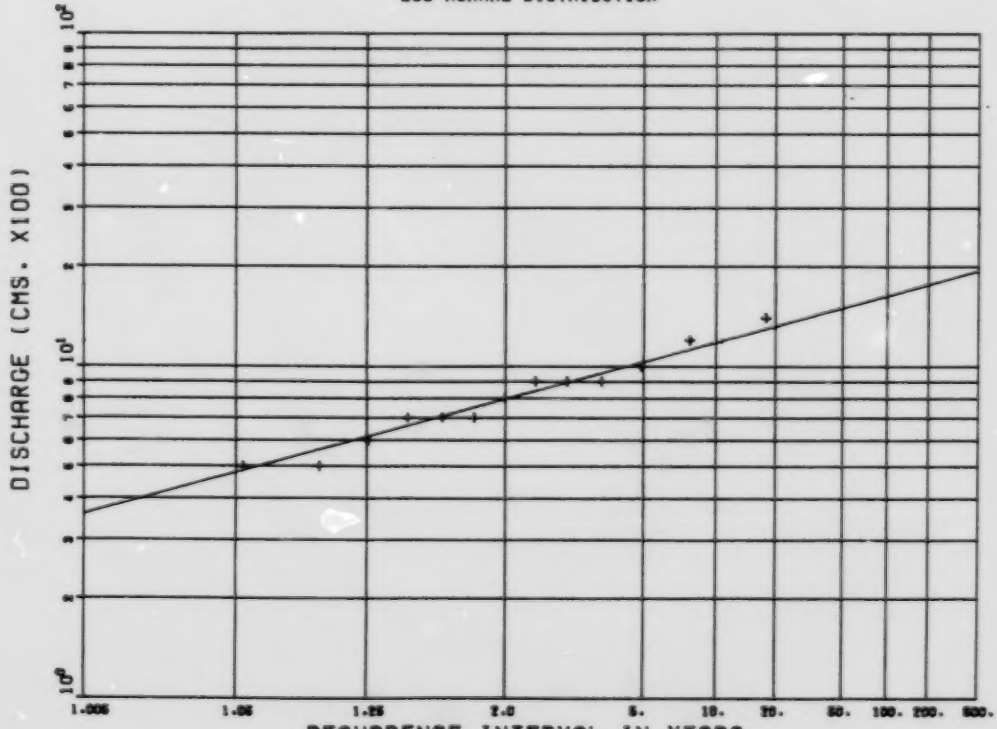
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	4.		4.		5.		7.		4.	
1.050	5.		5.		5.		0.		5.	
1.250	6.		6.		5.		0.		6.	
2.000	8.		8.		6.		0.		8.	
2.330	8.	8.49	8.	8.64	7.	18.40	0.	0.00	8.	9.35
5.000	10.	9.86	10.	9.98	14.	48.60	0.	0.00	10.	10.40
10.000	12.	11.00	12.	11.60	31.	72.60	0.	0.00	12.	12.50
20.000	13.	12.00	13.	13.20	64.	91.00	0.	0.00	13.	15.60
50.000	15.	13.10	15.	15.10	158.	110.00	0.	0.00	15.	20.60
100.000	16.	13.70	16.	16.50	293.	122.00	0.	0.00	17.	24.80
200.000	18.	14.30	18.	17.80	518.	132.00	0.	0.00	18.	29.30
500.000	20.	14.90	19.	19.40	1040.	145.00	0.	0.00	21.	35.50

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT

PERCH LAKE INLET NO. 3 NEAR CHALK RIVER 02KA006

LOG-NORMAL DISTRIBUTION



RECURRENCE INTERVAL IN YEARS

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I279.0

PERCH LAKE INLET NO. 4 NEAR CHALK RIVER 02KA007

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA = .2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 5. S.D. = 2.1 C.S. = .5492 C.K. = 3.3737
SAMPLE STATISTICS (LOGS)
MEAN = 1.6001 S.D. = .3881 C.S. = .1321 C.K. = 2.9134
SAMPLE MIN = 3. SAMPLE MAX = 9. N = 10

PARAMETERS FOR GUMBEL I A = .651894 U = 4.
PARAMETERS FOR LOGNORMAL M = 1.6001 S = .3881
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = .7526 S = .8773
STATISTICS OF LOG(X-A)
MEAN = .7526 S.D. = .8773 C.S. = -.4323 C.K. = 3.3456
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0256 B = .2291E+03 LOG(M) =-4.2734
ME= .1393E-01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

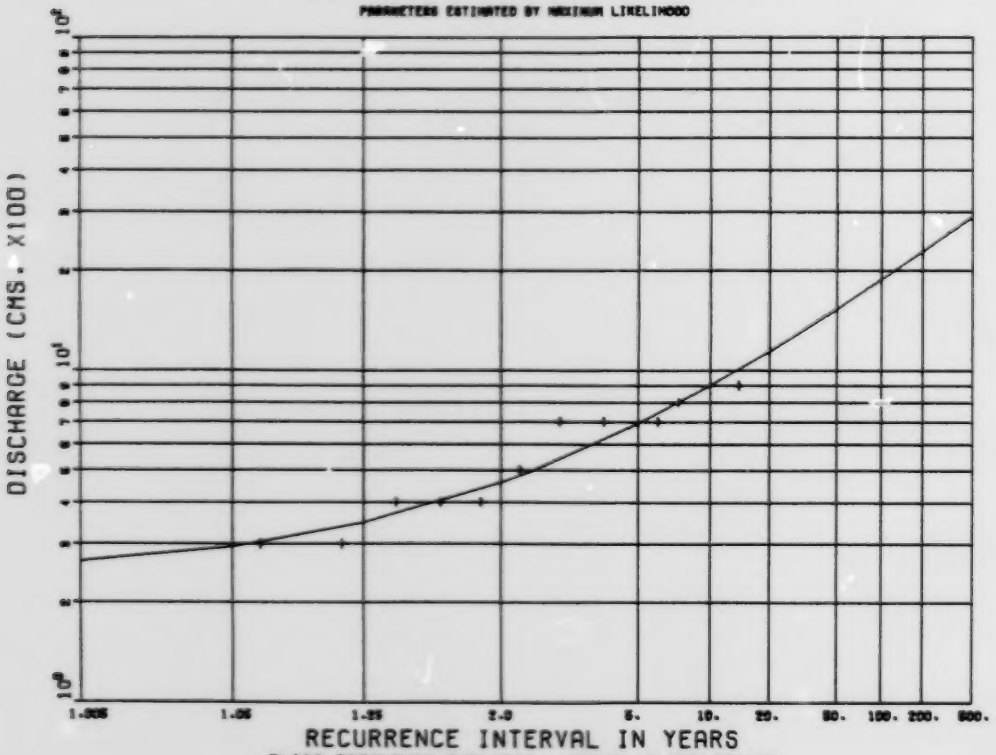
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	2.		2.		3.		0.		2.	
1.050	3.		3.		3.		0.		3.	
1.250	4.		4.		4.		0.		4.	
2.000	5.		5.		5.		0.		5.	
2.330	5.	11.70	5.	12.40	5.	14.50	0.	0.00	5.	13.40
5.000	7.	13.10	7.	14.30	7.	20.90	0.	0.00	7.	14.90
10.000	8.	14.30	8.	16.60	9.	27.90	0.	0.00	8.	17.90
20.000	9.	15.40	9.	18.80	11.	35.40	0.	0.00	10.	22.30
50.000	10.	16.50	11.	21.60	15.	45.20	0.	0.00	11.	29.40
100.000	11.	17.20	12.	23.60	19.	52.30	0.	0.00	13.	35.30
200.000	13.	17.70	14.	25.50	23.	59.10	0.	0.00	14.	41.70
500.000	14.	18.40	15.	27.80	29.	67.70	0.	0.00	16.	50.40

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

PERCH LAKE INLET NO. 4 NEAR CHALK RIVER 02KA007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1280.0

PERCH LAKE OUTLET NEAR CHALK RIVER 02KA003

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 7.3 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

SAMPLE STATISTICS
MEAN = 45. S.D. = 8.9 C.S. = -.2309 C.K. = 2.9095
SAMPLE STATISTICS (LOGS)
MEAN = 3.7798 S.D. = .2101 C.S. = -.5429 C.K. = 2.9444
SAMPLE MIN = 30. SAMPLE MAX = 60. N = 16

PARAMETERS FOR GUMBEL I A = .120926 U = 40.
PARAMETERS FOR LOGNORMAL M = 3.7798 S = .2101

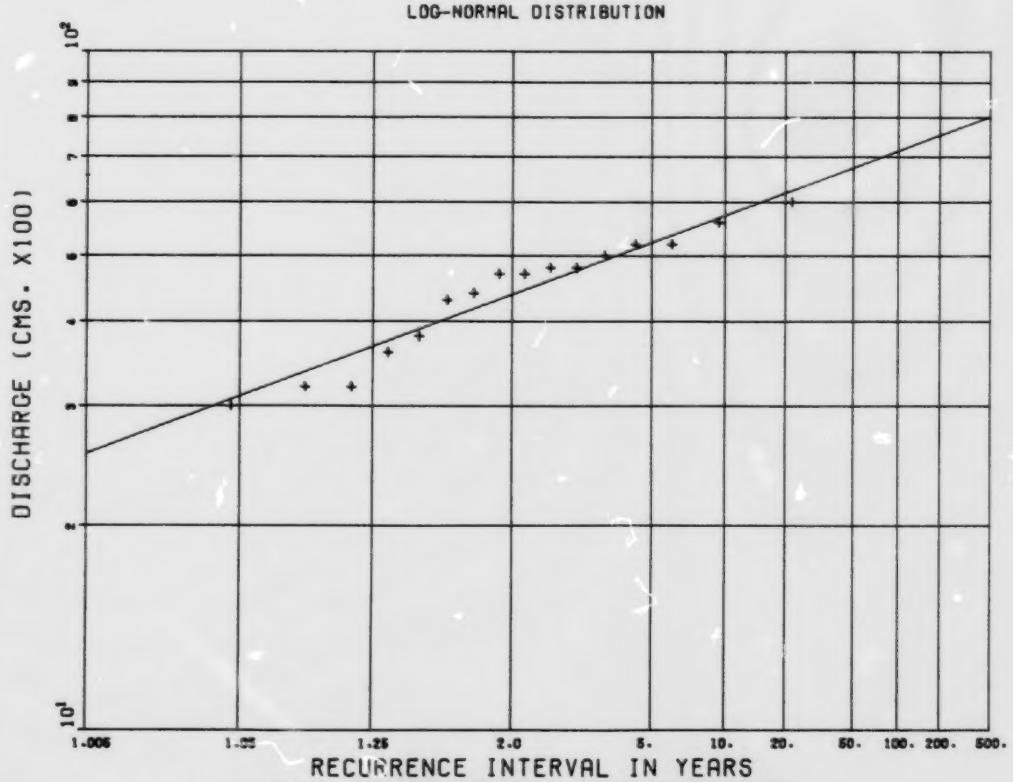
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0570 B = .1357E+02 LOG(M) = 4.5536
ME= .9497E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1117 B = .3604E+01
LOG(M)F= 4.1823 M = .6552E+02
DISTRIBUTION STATISTICS MEAN = 3.7798 S.D. = .2120 C.S. =-1.0535

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	27.		26.		0.		21.		23.	
1.050	31.		31.		0.		29.		30.	
1.250	36.		37.		0.		37.		37.	
2.000	43.		44.		0.		45.		45.	
2.330	45.	5.92	46.	5.29	0.	0.00	47.	4.88	46.	5.65
5.000	53.	7.07	52.	6.11	0.	0.00	52.	4.22	52.	5.22
10.000	59.	8.11	57.	7.09	0.	0.00	56.	3.91	57.	5.57
20.000	65.	9.02	62.	8.06	0.	0.00	58.	3.78	60.	6.73
50.000	73.	10.00	67.	9.26	0.	0.00	60.	3.87	63.	9.05
100.000	78.	10.70	71.	10.10	0.	0.00	61.	4.13	66.	11.10
200.000	84.	11.20	75.	10.90	0.	0.00	62.	4.50	68.	13.20
500.000	92.	11.90	80.	11.90	0.	0.00	63.	5.11	70.	16.20

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT

PERCH LAKE OUTLET NEAR CHALK RIVER 02KA003

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I281.0

PETAWAWA RIVER NEAR PETAWAWA 02KB001

DRAINAGE AREA : 4120.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1916 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	213.	75.	.305	2.919
LN X SERIES	5.30	.39	-.762	4.290

X(MIN)= 52. CMS. TOTAL SAMPLE SIZE= 67
X(MAX)= 403. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

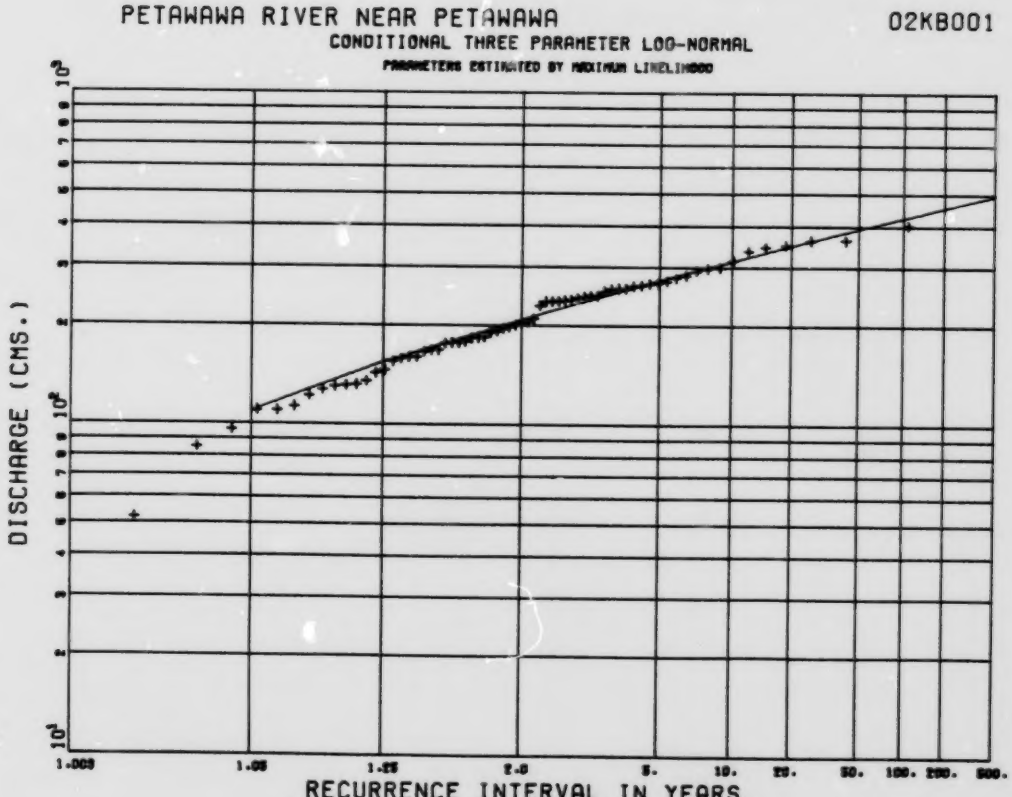
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	216.	72.	.410	2.854
LN X SERIES	5.32	.35	-.320	2.762
LN (X-A) SERIES	5.77	.22	-.050	2.579

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -112.0419 M = 5.7682 S = .2216

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	189.
1.250	.800	154.
2.000	.500	207.
2.330	.429	220.
5.000	.200	273.
10.000	.100	312.
20.000	.050	348.
50.000	.020	392.
100.000	.010	423.
200.000	.005	454.
500.000	.002	493.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I202.0

PIC RIVER NEAR MARATHON 02BB003

DRAINAGE AREA = 4270.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1978 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	438.	133.	.160	5.705
LN X SERIES	6.02	.40	-1.127	6.724

X(MIN)= 156. CMS. TOTAL SAMPLE SIZE= 13
X(MAX)= 759. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

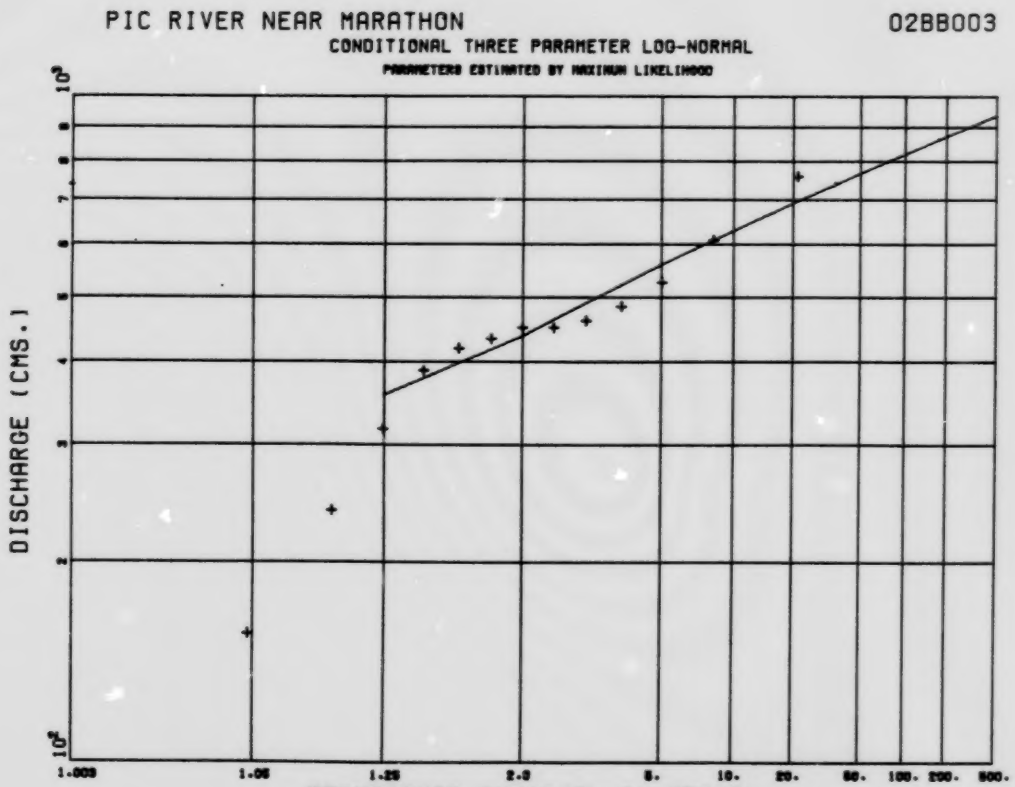
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	461.	133.	.721	6.664
LN X SERIES	6.10	.29	-.376	6.311
LN (X-A) SERIES	6.53	.19	.020	6.114

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -238.6674 M = 6.5349 S = .1872

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	356.
2.000	.500	417.
2.330	.429	461.
5.000	.200	559.
10.000	.100	629.
20.000	.050	692.
50.000	.020	767.
100.000	.010	820.
200.000	.005	871.
500.000	.002	936.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I293.0

PIGEON RIVER AT MIDDLE FALLS 02AA001

DRAINAGE AREA : 1550.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1924 - 1982

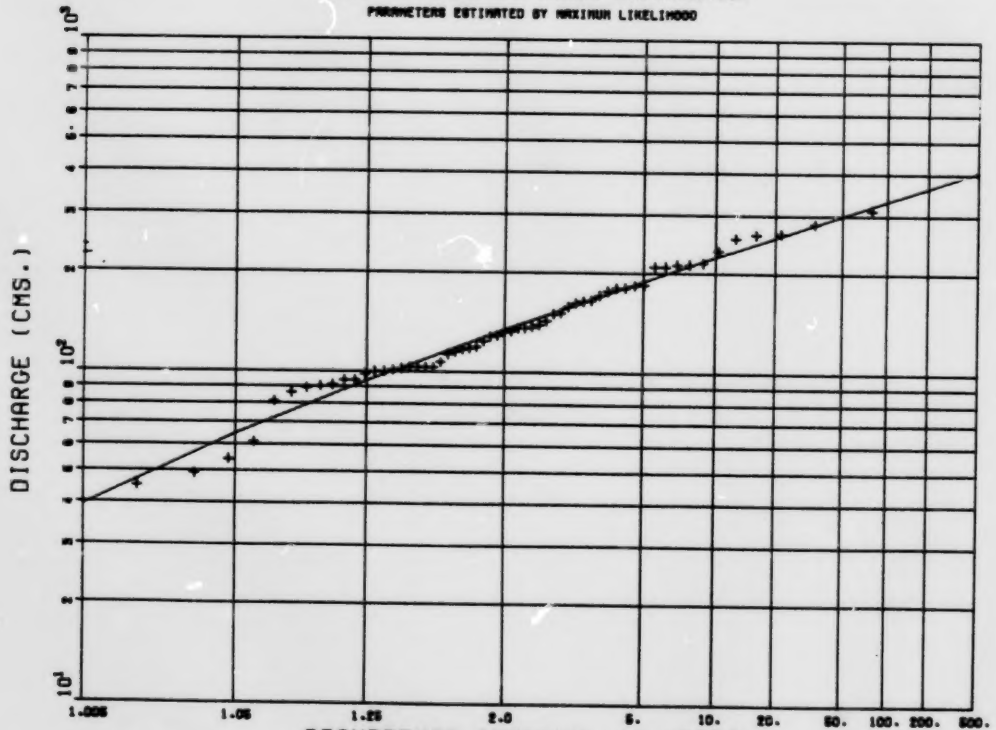
SAMPLE STATISTICS
MEAN = 143. S.D. = 59.5 C.S. = .8315 C.K. = 3.5023
SAMPLE STATISTICS (LOGS)
MEAN = 4.8816 S.D. = .4214 C.S. = -.2498 C.K. = 3.3085
SAMPLE MIN = 45. SAMPLE MAX = 311. N = 59

PARAMETERS FOR GUMBEL I A = .021402 U = 116.
PARAMETERS FOR LOGNORMAL M = 4.8816 S = .4214
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -27. N = 5.0810 S = .3437
STATISTICS OF LOG(X-A)
MEAN = 5.0810 S.D. = .3437 C.S. = -.0187 C.K. = 3.0494
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8526 B = .6412E+02 LOG(M) = 8.2560
ME= .3851E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0568 B = .5425E+02
LOG(M)F= 7.9614 M = .2868E+04
DISTRIBUTION STATISTICS MEAN = 4.8816 S.D. = .4182 C.S. = -.2715

RETURN PERIOD	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	38.		45.		39.		48.		40.	
1.050	64.		66.		64.		64.		64.	
1.250	94.		93.		93.		93.		93.	
2.000	134.		132.		134.		134.		134.	
2.333	143.	5.38	142.	5.53	144.	5.67	145.	5.78	145.	5.90
5.000	186.	5.88	188.	6.38	186.	5.96	188.	5.89	189.	5.98
10.000	222.	6.35	226.	7.40	223.	6.96	222.	6.56	223.	6.71
20.000	255.	6.74	264.	8.42	256.	8.30	254.	7.75	256.	8.05
50.000	299.	7.16	313.	9.67	299.	10.30	293.	9.89	296.	10.50
100.000	331.	7.42	351.	10.60	331.	11.80	321.	11.80	325.	12.60
200.000	364.	7.64	390.	11.40	363.	13.40	348.	13.80	354.	14.80
500.000	407.	7.88	444.	12.40	406.	15.40	384.	16.50	391.	17.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

PIGEON RIVER AT MIDDLE FALLS 02AA001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I284.0

PINE RIVER AT LURGAN 02FD001

DRAINAGE AREA : 154.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1974 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	92.	50.	.759	6.768
LN X SERIES	4.37	.64	-.910	6.724

X(MIN)= 21. CMS. TOTAL SAMPLE SIZE= 10
X(MAX)= 196. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

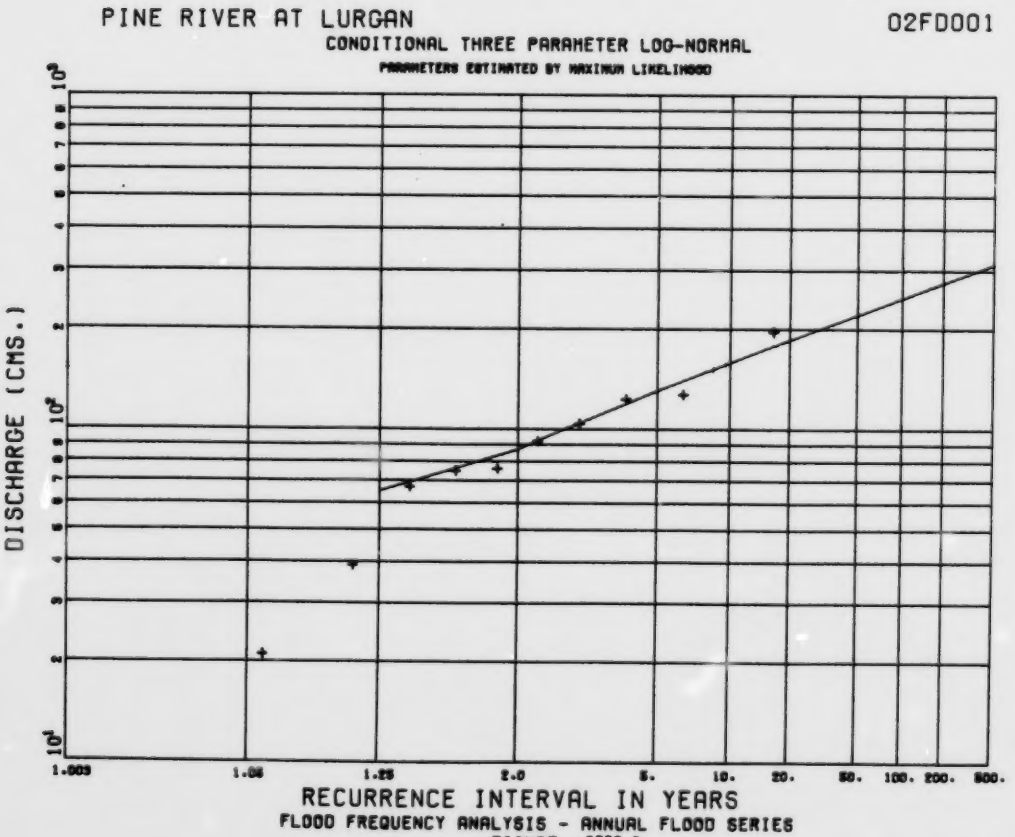
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	100.	46.	1.073	8.139
LN X SERIES	4.51	.46	-.256	6.878
LN (X-A) SERIES	4.67	.39	-.040	6.712

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -13.9080 M = 4.6661 S = .3935

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	65.
2.000	.500	87.
2.330	.429	95.
5.000	.200	130.
10.000	.100	158.
20.000	.050	185.
50.000	.020	220.
100.000	.010	247.
200.000	.005	275.
500.000	.002	312.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I285.0

PINE RIVER NEAR EVERETT 02ED103

DRAINAGE AREA : 195.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1969 - 1982

SAMPLE STATISTICS
MEAN = 25. S.D. = 11.7 C.S. = 1.1133 C.K. = 4.7714
SAMPLE STATISTICS (LOGS)
MEAN = 3.1388 S.D. = .4383 C.S. = .3013 C.K. = 3.2411
SAMPLE MIN = 12. SAMPLE MAX = 53. N = 14

PARAMETERS FOR GUMBEL I A = .123019 U = 20.
PARAMETERS FOR LOGNORMAL M = 3.1388 S = .4383
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 9. M = 2.5738 S = .7495
STATISTICS OF LOG(X-A)
MEAN = 2.5738 S.D. = .7495 C.S. = -.2456 C.K. = 3.2719
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0000 B = .4407E+02 LOG(P) = .2288
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1257E+01
A = .1441 B = .5727E+01
LOG(P)F= 2.9847 M = .3042E+01
DISTRIBUTION STATISTICS MEAN = 3.1388 S.D. = .4405 C.S. = .8358

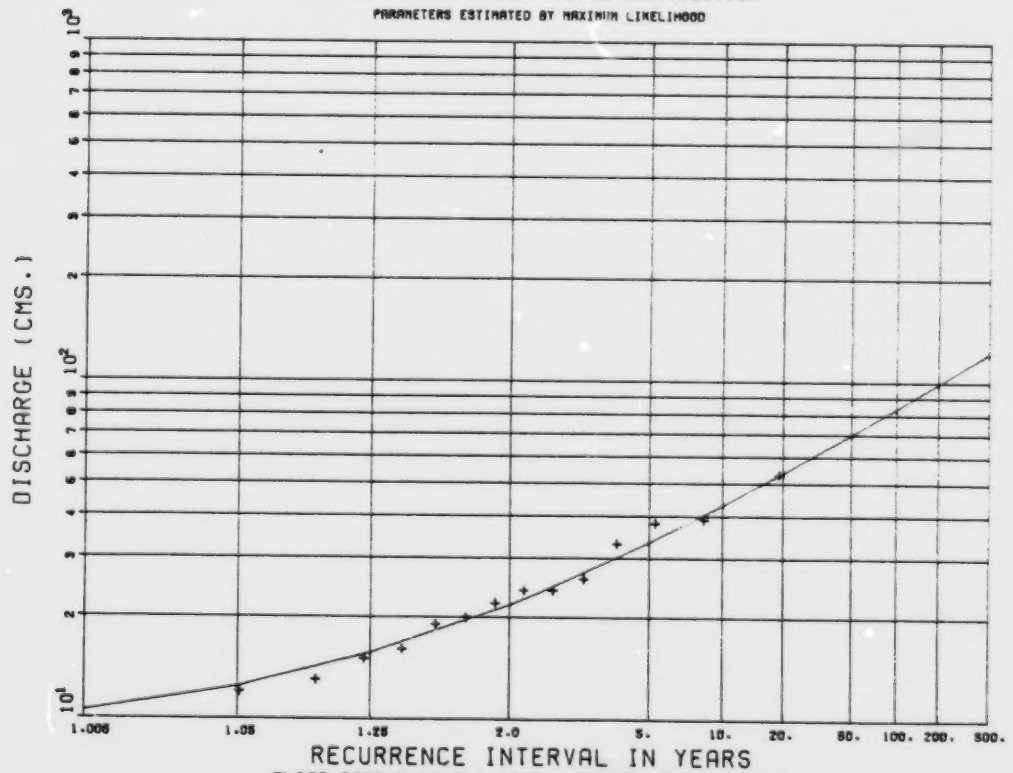
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	7.		7.		11.		10.		8.	
1.050	11.		11.		12.		13.		12.	
1.250	16.		16.		16.		16.		16.	
2.000	21.		23.		22.		22.		23.	
2.333	25.	11.00	25.	11.80	24.	13.30	24.	12.50	24.	12.90
5.000	32.	12.10	33.	13.60	33.	17.30	32.	16.50	33.	14.80
10.000	39.	13.00	41.	15.80	43.	22.20	42.	21.80	41.	18.30
20.000	44.	13.80	48.	18.00	54.	27.50	52.	28.10	49.	23.30
50.000	52.	14.70	57.	20.70	70.	34.70	69.	37.40	61.	31.30
100.000	58.	15.20	64.	22.60	84.	40.60	83.	44.90	72.	37.90
200.000	63.	15.70	71.	24.30	99.	45.10	101.	52.70	81.	45.00
500.000	71.	16.20	82.	26.60	122.	51.60	130.	63.50	96.	54.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PINE RIVER NEAR EVERETT 02ED103

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I286.0

PINEIMUTA RIVER AT EYES LAKE 04FA003

DRAINAGE AREA = 4900.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

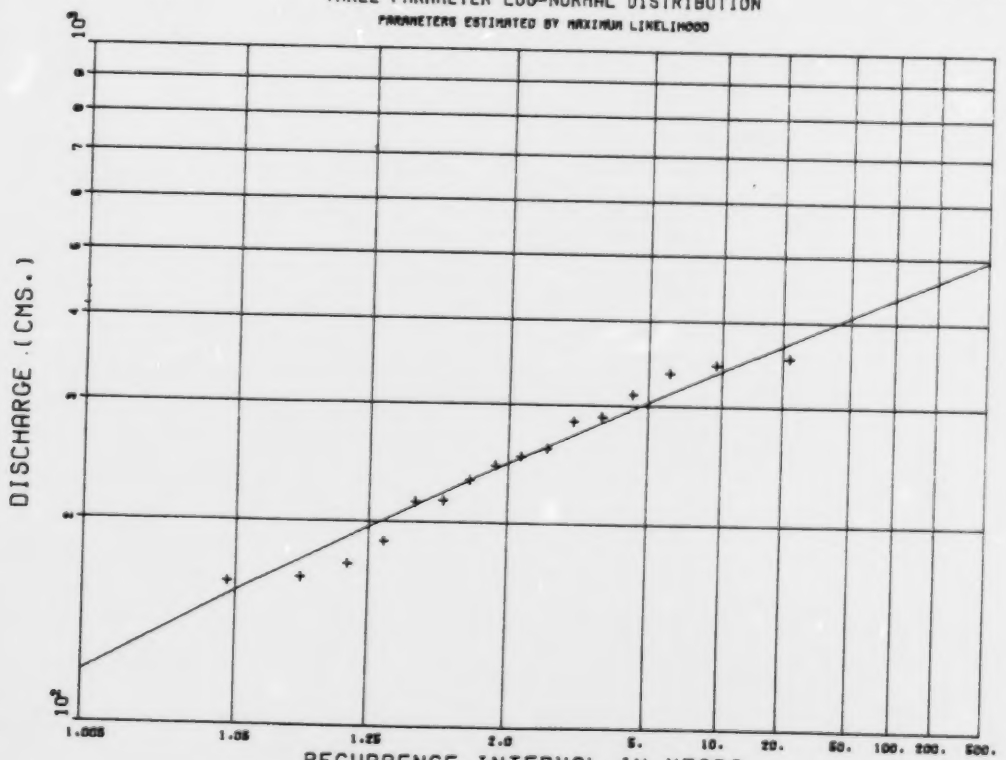
SAMPLE STATISTICS
MEAN = 251. S.D. = 63.9 C.S. = .1883 C.K. = 2.5847
SAMPLE STATISTICS (LOGS)
MEAN = 5.4940 S.D. = .2604 C.S. = -.1534 C.K. = 2.5784
SAMPLE MIN = 162. SAMPLE MAX = 354. N = 16

PARAMETERS FOR GUMBEL I A = .019644 U = 221.
PARAMETERS FOR LOGNORMAL P = 5.4940 S = .2604
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -55. M = 5.7014 S = .2115
STATISTICS OF LOG(X-A)
MEAN = 5.7014 S.D. = .2115 C.S. = -.0895 C.K. = 2.5604
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0200 B = .1693E+03 LOG(M) = 5.8879
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .7244E+04
A = -.3094 B = .1237E+01
LOG(M)= 5.8747 M = .7566E+03
DISTRIBUTION STATISTICS MEAN = 5.4940 S.D. = .3441 C.S. =-1.7394

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	131.		124.		113.		58.		122.	
1.050	161.		158.		157.		124.		157.	
1.250	195.		195.		196.		195.		196.	
2.000	245.		243.		245.		267.		245.	
2.330	252.	6.75	255.	6.56	256.	6.89	280.	0.00	256.	7.31
5.000	321.	8.32	303.	7.58	301.	7.28	320.	0.00	303.	7.30
10.000	341.	9.08	340.	8.79	338.	8.50	317.	0.00	339.	8.34
20.000	380.	9.98	373.	9.99	369.	10.20	347.	0.00	369.	10.10
50.000	430.	11.00	415.	11.50	409.	12.80	353.	0.00	406.	13.10
100.000	467.	11.60	446.	12.50	435.	15.00	355.	0.00	437.	15.60
200.000	505.	12.10	476.	13.50	461.	17.20	356.	0.00	458.	18.40
500.000	554.	12.80	515.	14.80	495.	20.00	357.	0.00	491.	22.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

PINEIMUTA RIVER AT EYES LAKE 04FA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I287.0

PINEWOOD RIVER NEAR PINEWOOD 05PC011

DRAINAGE AREA : 461.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1952 - 1982

SAMPLE STATISTICS
MEAN = 39. S.D. = 22.6 C.S. = 1.0940 C.K. = 5.0998
SAMPLE STATISTICS (LOGS)
MEAN = 3.4968 S.D. = .6035 C.S. = -.0932 C.K. = 2.2790
SAMPLE MIN = 12. SAMPLE MAX = 111. N = 31

PARAMETERS FOR GUMBEL I A = .359844 U = 29.
PARAMETERS FOR LOGNORMAL M = 3.4368 S = .6035
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 7. N = 3.1917 S = .8052
STATISTICS OF LOG(X-A)
MEAN = 3.1917 S.D. = .8052 C.S. = -.3405 C.K. = 2.3393
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0281 σ = .4602E+03 LOG(P) =16.4329
ME= .1370E+08
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = 7.0923 B = .4211E+02
LOG(P)F= 7.3597 N = .1571E+04
DISTRIBUTION STATISTICS MEAN = 3.4968 S.D. = .5968 C.S. = -.3082

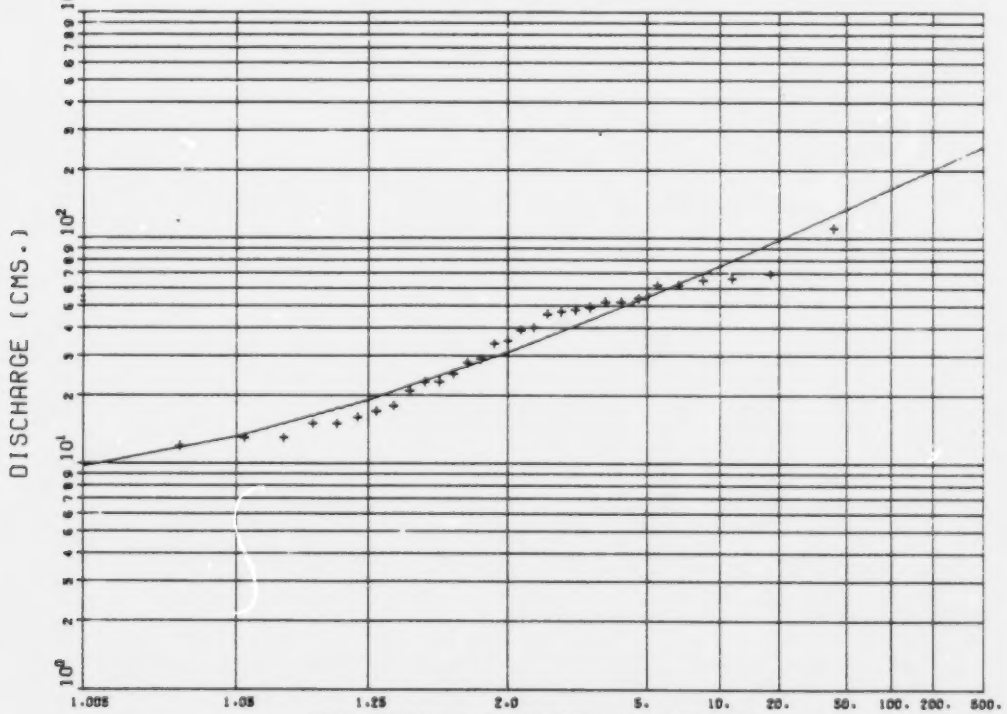
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1.		7.		10.		6.		7.	
1.050	12.		12.		13.		12.		12.	
1.250	21.		20.		19.		20.		20.	
2.000	35.		33.		31.		34.		33.	
5.330	38.	9.95	35.	10.90	35.	12.20	37.	11.30	37.	11.70
10.000	54.	10.10	54.	12.60	55.	14.80	54.	11.50	55.	12.40
20.000	66.	10.50	71.	14.50	75.	18.20	69.	12.70	70.	14.30
50.000	78.	10.80	88.	16.60	98.	22.60	83.	14.90	87.	17.30
100.000	94.	11.30	113.	19.10	134.	27.60	101.	18.90	110.	22.50
200.000	105.	11.50	133.	20.90	165.	30.60	114.	22.40	128.	27.00
500.000	117.	11.70	155.	22.50	200.	34.00	128.	26.20	147.	31.70
	132.	11.90	186.	24.60	254.	38.30	146.	31.50	174.	38.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

PINEWOOD RIVER NEAR PINEWOOD 05PC011

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I208.0

PIPESTONE RIVER AT KARL LAKE 04DA001

DRAINAGE AREA = 5960.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1980

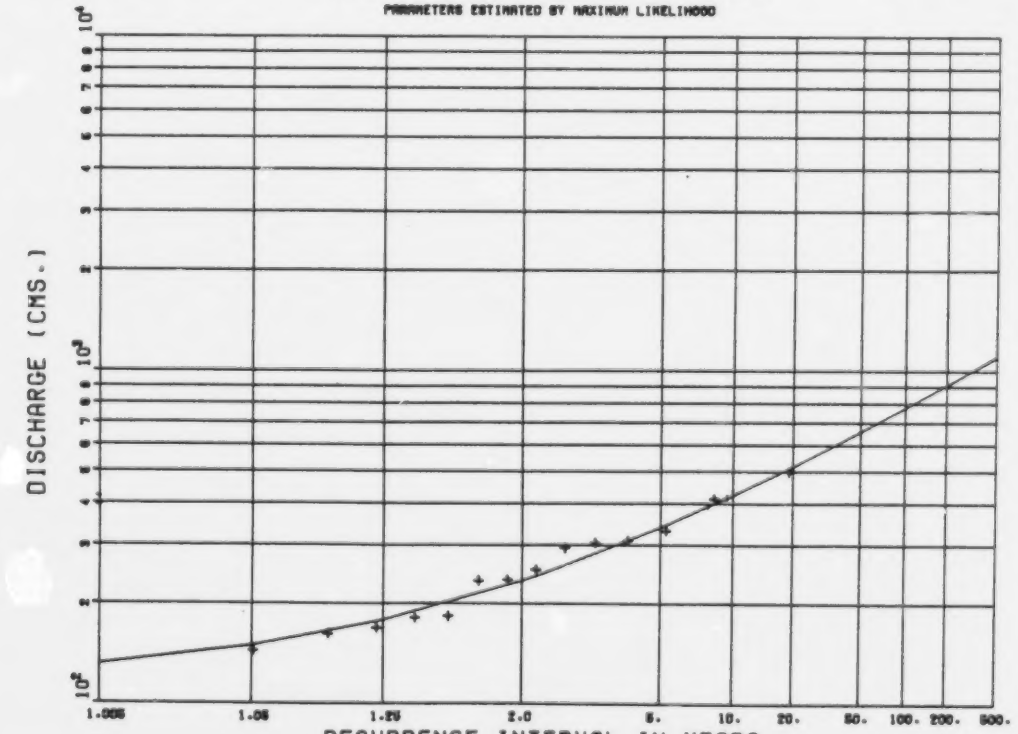
SAMPLE STATISTICS
MEAN = 265. S.D. = 102.1 C.S. = .9701 C.K. = 4.5118
SAMPLE STATISTICS (LOGS)
MEAN = 5.5157 S.D. = .3693 C.S. = .2789 C.K. = 3.1487
SAMPLE MIN = 144. SAMPLE MAX = 499. N = 14

PARAMETERS FOR GUMBEL I A = .013559 U = 220.
PARAMETERS FOR LOGNORMAL M = 5.5157 S = .3693
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 111. M = 4.8120 S = .7240
STATISTICS OF LOG(X-A)
MEAN = 4.8120 S.D. = .7240 C.S. = -.2716 C.K. = 3.0682
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0915 B = .5144E+02 LOG(M) = 2.8673
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1759E+02
A = .2103 B = .3377E+01
LOG(M)F= 4.8053 M = .1222E+03
DISTRIBUTION STATISTICS MEAN = 5.5157 S.D. = .3866 C.S. = 1.0883

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	97.		96.		131.		133.		106.	
1.050	138.		135.		149.		151.		140.	
1.250	185.		182.		178.		179.		181.	
2.000	247.		249.		234.		232.		244.	
2.330	263.	9.50	265.	9.95	251.	11.20	248.	10.60	261.	10.90
5.000	331.	10.70	339.	11.50	338.	15.10	331.	15.10	337.	12.40
10.000	386.	11.80	399.	13.30	423.	19.20	416.	20.40	403.	15.30
20.000	439.	12.70	456.	15.10	516.	24.90	515.	26.40	469.	19.60
50.000	508.	13.60	531.	17.40	656.	31.90	674.	35.00	560.	26.00
100.000	560.	14.20	587.	19.00	774.	37.10	820.	41.90	633.	31.50
200.000	611.	14.70	644.	20.50	905.	42.10	994.	49.00	709.	37.30
500.000	679.	15.30	720.	22.40	1100.	48.60	1280.	58.90	817.	45.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

PIPESTONE RIVER AT KARL LAKE 04DA001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I289.0

RAINY RIVER AT FORT FRANCES 05PC019

DRAINAGE AREA : 38600.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1923 - 1982

SAMPLE STATISTICS
MEAN = 723. S.D. = 294.8 C.S. = -.3178 C.K. = 2.3633
SAMPLE STATISTICS (LOGS)
MEAN = 6.4698 S.D. = .5276 C.S. = -1.0674 C.K. = 3.3460
SAMPLE MIN = 149. SAMPLE MAX = 1366. N = 60

PARAMETERS FOR GUMBEL I A = .003477 U = 573.
PARAMETERS FOR LOGNORMAL M = 6.4698 S = .5276

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2816 B = .3511E+01 LOG(M) = 7.4584
ME= .1734E+04

PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.3288 B = .2410E+01
LOG(M)F= 7.2620 M = .1425E+04

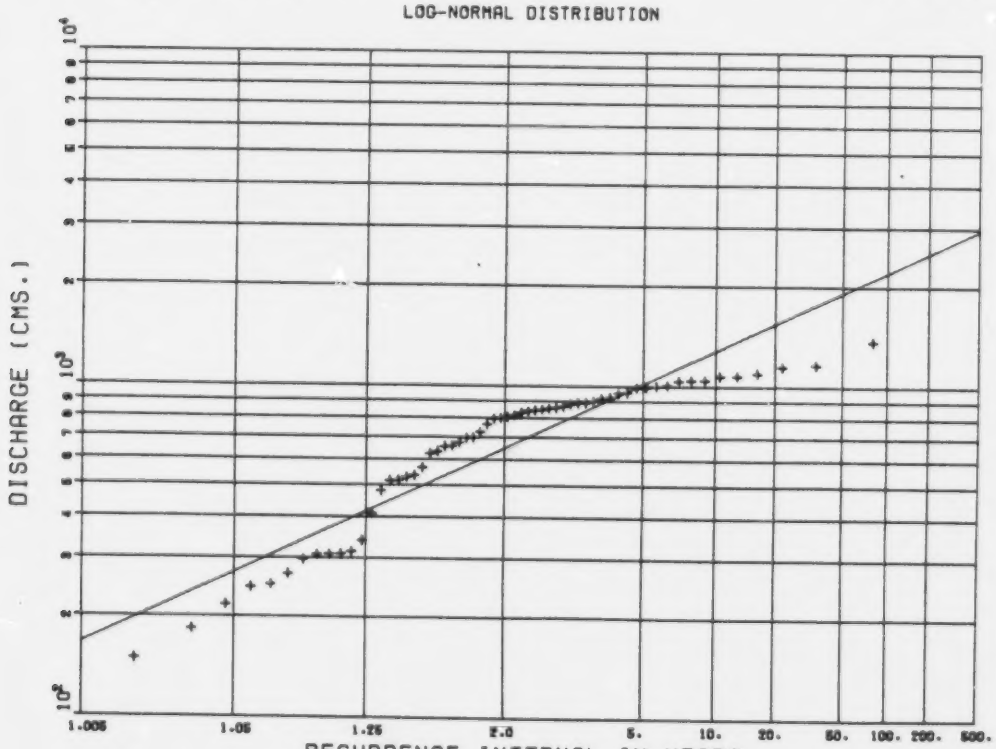
DISTRIBUTION STATISTICS MEAN = 6.4698 S.D. = .5103 C.S. =-1.2884

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	93.		166.		0.		95.		98.	
1.050	252.		271.		0.		243.		239.	
1.250	436.		414.		0.		448.		435.	
2.000	678.		645.		0.		717.		707.	
2.330	739.	6.37	709.	6.86	0.	0.00	776.	0.00	770.	7.51
5.000	1000.	6.66	1010.	7.93	0.	0.00	988.	0.00	1010.	5.49
10.000	1220.	7.04	1270.	9.19	0.	0.00	1110.	0.00	1160.	6.09
20.000	1430.	7.36	1540.	10.40	0.	0.00	1200.	0.00	1280.	8.78
50.000	1690.	7.71	1910.	12.00	0.	0.00	1280.	0.00	1400.	13.20
100.000	1900.	7.92	2200.	13.10	0.	0.00	1320.	0.00	1470.	16.60
200.000	2100.	8.10	2510.	14.20	0.	0.00	1350.	0.00	1520.	19.90
500.000	2360.	8.29	2950.	15.50	0.	0.00	1380.	0.00	1580.	23.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

RAINY RIVER AT FORT FRANCES 05PC019

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I290.0

RAINY RIVER AT MANITOU RAPIDS 05PC018

DRAINAGE AREA : 50200.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1929 - 1982

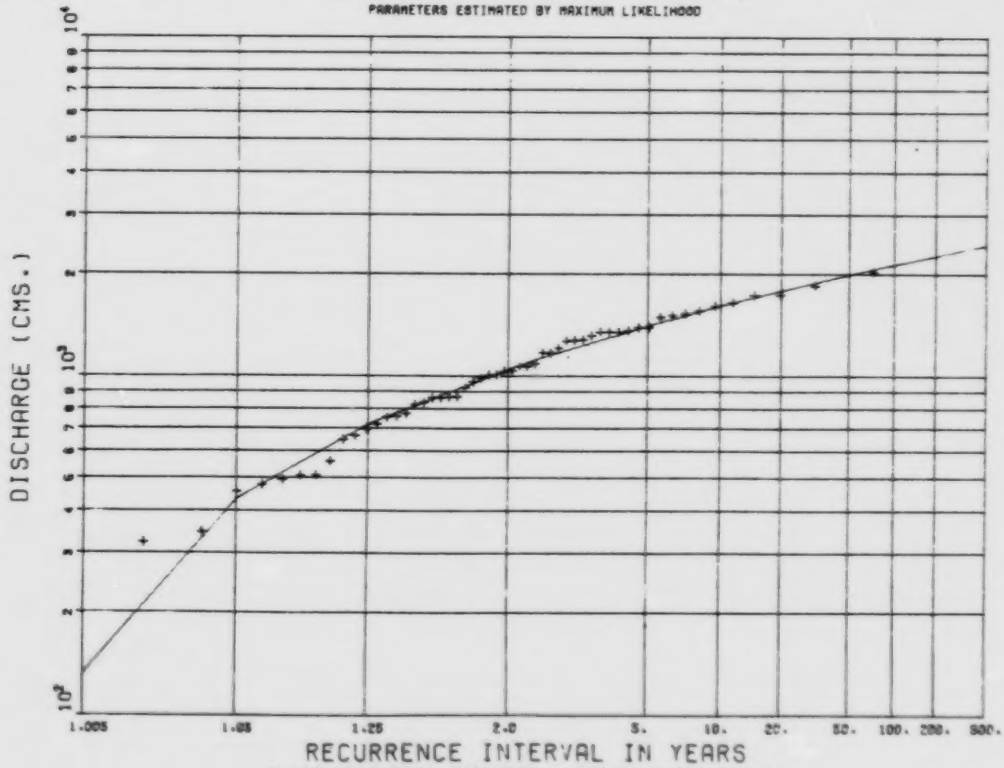
SAMPLE STATISTICS
MEAN = 1066. S.D. = 409.7 C.S. = .1997 C.K. = 2.5671
SAMPLE STATISTICS (LOGS)
MEAN = 6.8879 S.D. = .4330 C.S. = -.6663 C.K. = 3.1171
SAMPLE MIN = 322. SAMPLE MAX = 2030. N = 54

PARAMETERS FOR GUMBEL I A = .002742 U = 857.
PARAMETERS FOR LOGNORMAL M = 6.8879 S = .4330
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2579. M = 9.1950 S = .1125
STATISTICS OF LOG(X-A)
MEAN = 9.1950 S.D. = .1125 C.S. = -.0287 C.K. = 2.4798
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1443 B = .9010E+01 LOG(M) = 8.1877
ME= .3596E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2164 B = .4104E+01
LOG(M)= 7.7781 M = .2388E+04
DISTRIBUTION STATISTICS MEAN = 6.8879 S.D. = .4394 C.S. = -.9872

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	258.		321.		132.		211.		245.	
1.050	461.		481.		431.		433.		448.	
1.250	693.		681.		716.		713.		696.	
2.000	1000.		980.		1043.		1050.		1030.	
2.330	1080.	5.84	1060.	5.94	1123.	5.47	1130.	5.61	1110.	6.36
5.000	1410.	6.33	1410.	6.86	1400.	5.07	1420.	4.93	1420.	5.60
10.000	1690.	6.80	1710.	7.95	1610.	5.61	1610.	4.64	1640.	5.90
20.000	1950.	7.20	2000.	9.04	1780.	6.32	1750.	4.57	1830.	7.28
50.000	2290.	7.62	2390.	10.40	1990.	7.65	1900.	4.85	2030.	10.10
100.000	2540.	7.88	2680.	11.30	2130.	8.72	1990.	5.26	2170.	12.50
200.000	2800.	8.11	2990.	12.20	2262.	9.81	2060.	5.85	2300.	15.00
500.000	3130.	8.35	3410.	13.40	2431.	11.20	2140.	6.72	2440.	18.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

RAINY RIVER AT MANITOU RAPIDS 05PC018
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I291.0

RAISIN RIVER NEAR WILLIAMSTOWN 02MC001

DRAINAGE AREA : 404.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1961 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	90.	29.	-.228	3.403
LN X SERIES	4.44	.38	-1.843	4.478

X(MIN)= 33. CMS. TOTAL SAMPLE SIZE= 22
X(MAX)= 146. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	93.	27.	-.145	3.549
LN X SERIES	4.48	.32	-.878	4.359
LN (X-A) SERIES	6.31	.05	-.007	3.591

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 645.5189 M = 6.3141 S = .0484

FLOOD FREQUENCY REGIME

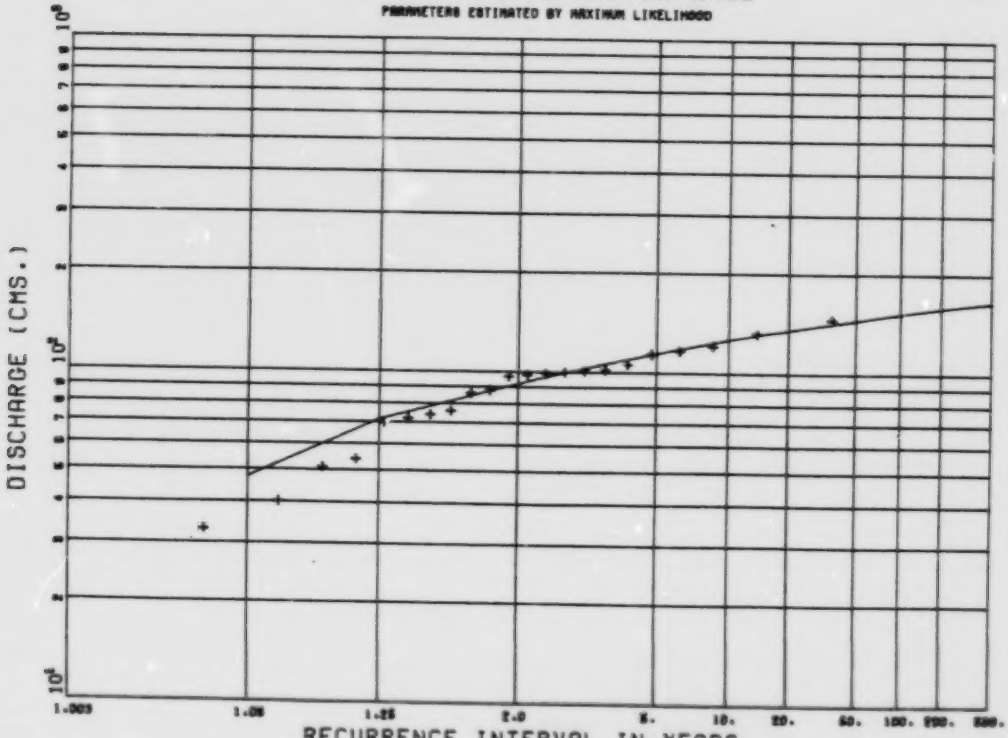
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	47.
1.250	.800	71.
2.000	.500	93.
2.330	.429	97.
5.000	.200	114.
10.000	.100	126.
20.000	.050	135.
50.000	.020	145.
100.000	.010	152.
200.000	.005	158.
500.000	.002	165.

RAISIN RIVER NEAR WILLIAMSTOWN 02MC001

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I292.0

RIDEAU RIVER ABOVE SMITHS FALLS 02LA005

DRAINAGE AREA = 1290.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 66. S.D. = 21.9 C.S. = .0888 C.K. = 2.2955
SAMPLE STATISTICS (LOGS)
MEAN = 4.1440 S.D. = .3428 C.S. = -.0842 C.K. = 2.2074
SAMPLE MIN = 42. SAMPLE MAX = 95. N = 10

PARAMETERS FOR GUMBEL I A = .056889 U = 56.
PARAMETERS FOR LOGNORMAL M = 4.1440 S = .3428
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 42. M = 2.1343 S = 2.1770
STATISTICS OF LOG(X-A)
MEAN = 2.1343 S.D. = 2.1770 C.S. = -1.2254 C.K. = 5.2362
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0144 B = .5642E+03 LOG(M) =12.2864
ME= .2167E+06

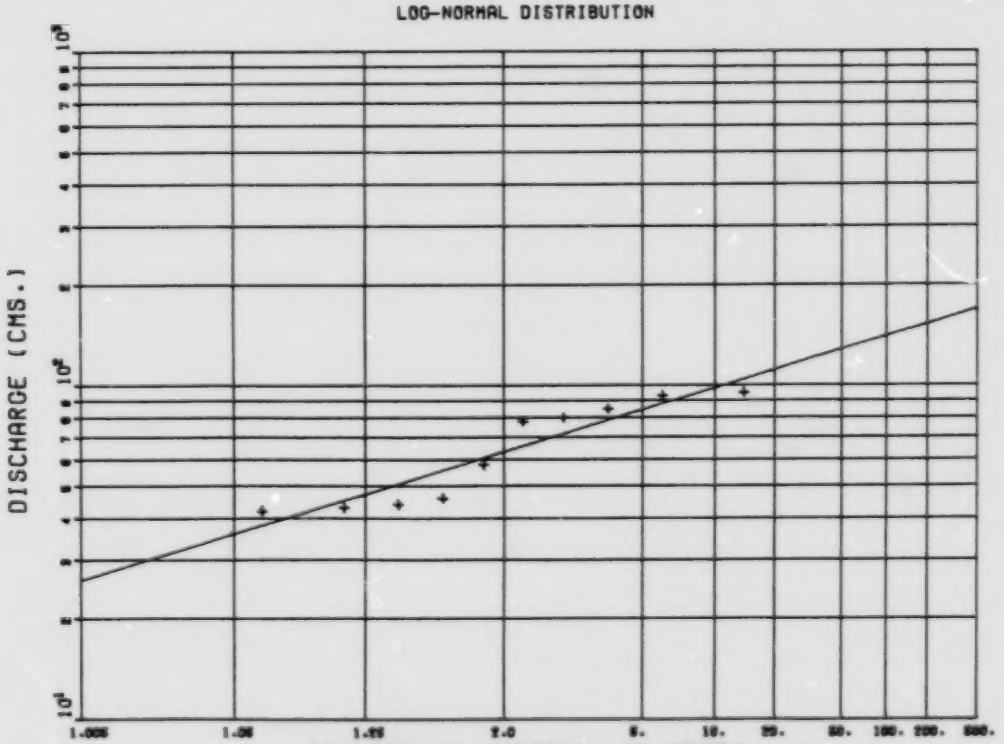
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	27.		26.		42.		0.		25.	
1.050	37.		36.		42.		0.		36.	
1.250	48.		47.		43.		0.		47.	
2.000	63.		63.		50.		0.		63.	
2.330	66.	10.60	67.	10.90	54.	15.90	0.	0.00	67.	11.70
5.000	83.	12.10	84.	12.60	95.	44.70	0.	0.00	84.	12.40
10.000	96.	13.40	98.	14.60	180.	71.30	0.	0.00	98.	14.30
20.000	108.	14.50	111.	16.60	345.	93.00	0.	0.00	110.	17.40
50.000	125.	15.70	128.	19.10	701.	115.00	0.	0.00	126.	22.60
100.000	137.	16.40	140.	20.90	1380.	129.00	0.	0.00	137.	27.10
200.000	149.	17.00	152.	22.50	2550.	141.00	0.	0.00	148.	31.90
500.000	165.	17.70	169.	24.60	4510.	155.00	0.	0.00	163.	38.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

RIDEAU RIVER ABOVE SMITHS FALLS 02LA005

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I293.0

RIDEAU RIVER AT OTTAWA 02LA004

DRAINAGE AREA : 3830.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1949 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	400.	117.	-.037	3.933
LN X SERIES	5.93	.38	-1.606	6.005

X(MIN)= 120. CMS. TOTAL SAMPLE SIZE= 34
X(MAX)= 597. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

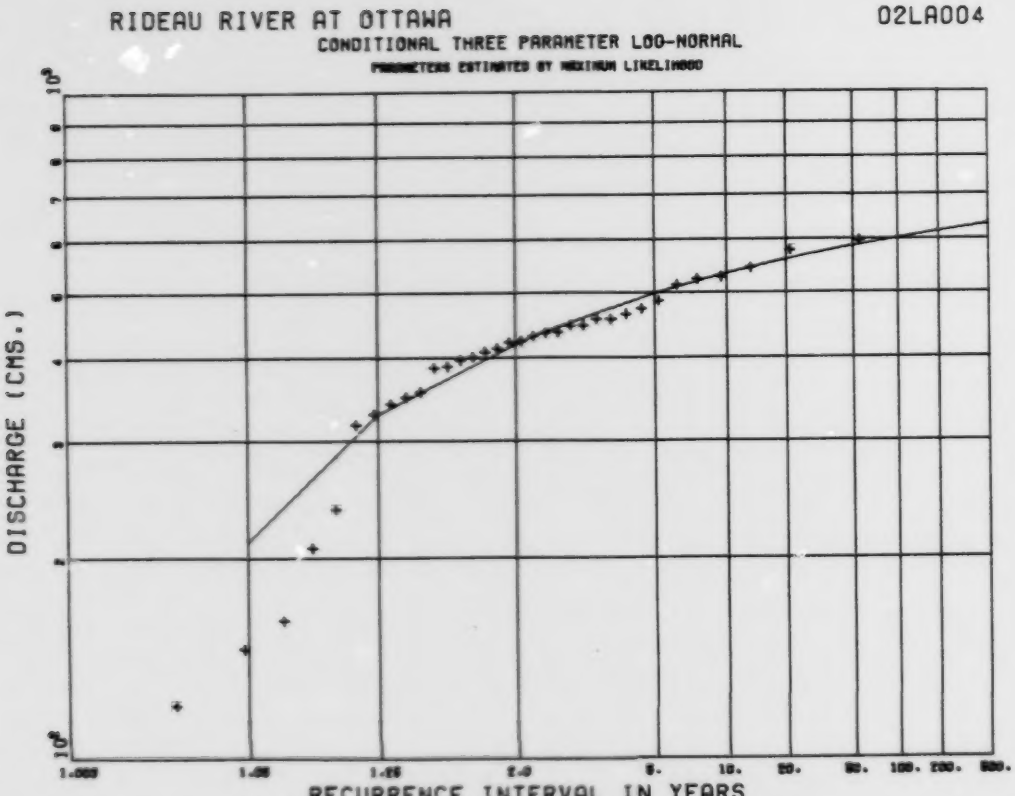
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	409.	108.	-.776	4.142
LN X SERIES	5.97	.31	-1.659	6.310
LN (X-A) SERIES	6.00	.25	.006	3.720

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 826.4885 N = 6.0037 S = .2534

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	211.
1.250	.800	328.
2.000	.500	418.
2.326	.429	436.
5.000	.200	498.
10.000	.100	533.
20.000	.050	559.
50.000	.020	585.
100.000	.010	601.
200.000	.005	615.
500.000	.002	631.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I294.0

ROCKY SAUGEEN RIVER NEAR TRAVERSTON 02FC004

DRAINAGE AREA = 249.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1915 - 1940

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	19.	8.	1.656	10.386
LN X SERIES	2.83	.4	-.932	7.494

X(MIN)= 4. CMS. TOTAL SAMPLE SIZE= 26
X(MAX)= 49. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	19.	8.	2.268	11.721
LN X SERIES	2.88	.36	.283	6.297
LN (X-A) SERIES	2.86	.37	.236	6.307

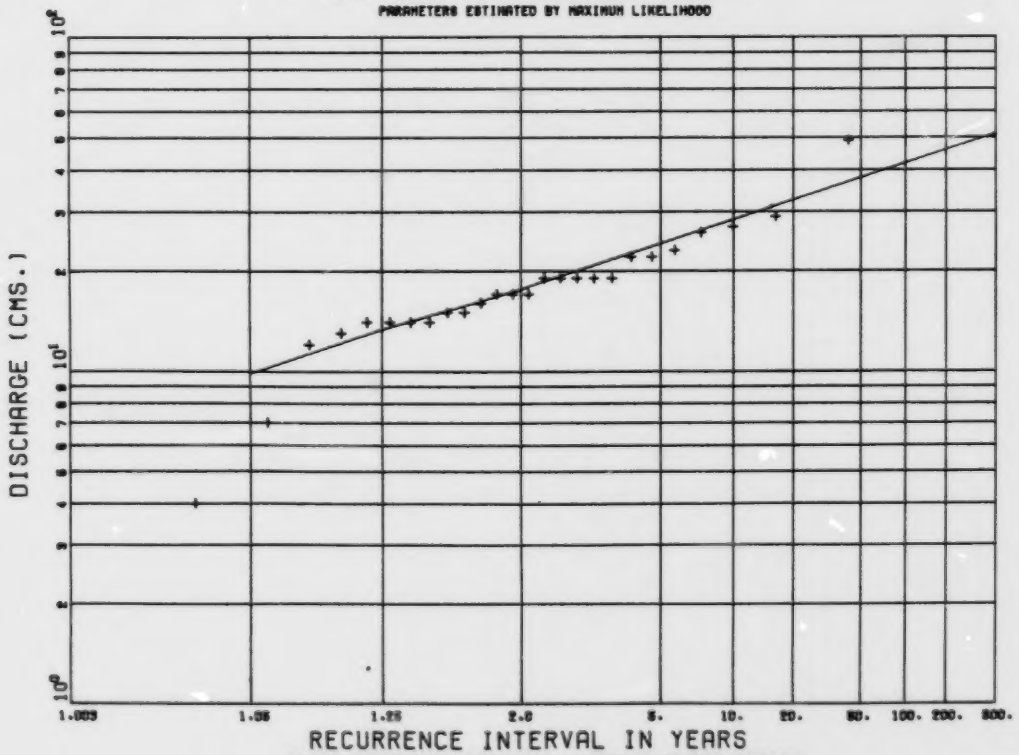
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = .3601 M = 2.8620 S = .3725

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	10.
1.250	.800	13.
2.000	.500	18.
2.330	.429	19.
5.000	.200	24.
10.000	.100	28.
20.000	.050	32.
50.000	.020	38.
100.000	.010	42.
200.000	.005	46.
500.000	.002	51.

ROCKY SAUGEEN RIVER NEAR TRAVERSTON 02FC004
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I295.0

ROOT RIVER AT SAULT STE. MARIE 02CA002

DRAINAGE AREA : 108.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1983

SAMPLE STATISTICS
MEAN = 34. S.D. = 12.5 C.S. = .8898 C.K. = 3.9178
SAMPLE STATISTICS (LOGS)
MEAN = 3.4627 S.D.= .3538 C.S. = .3280 C.K. = 3.1570
SAMPLE MIN = 20. SAMPLE MAX = 58. N = 13

PARAMETERS FOR GUMBEL I A = .111393 U = 28.
PARAMETERS FOR LOGNORMAL M = 3.4627 S = .3538
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 16. M = 2.5905 S = .8127
STATISTICS OF LOG(X-A)
MEAN = 2.5905 S.D. = .8127 C.S. = -.3471 C.K. = 3.0959
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0580 B = .3717E+02 LOG(M) = 1.3058
ME= .3691E+01

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

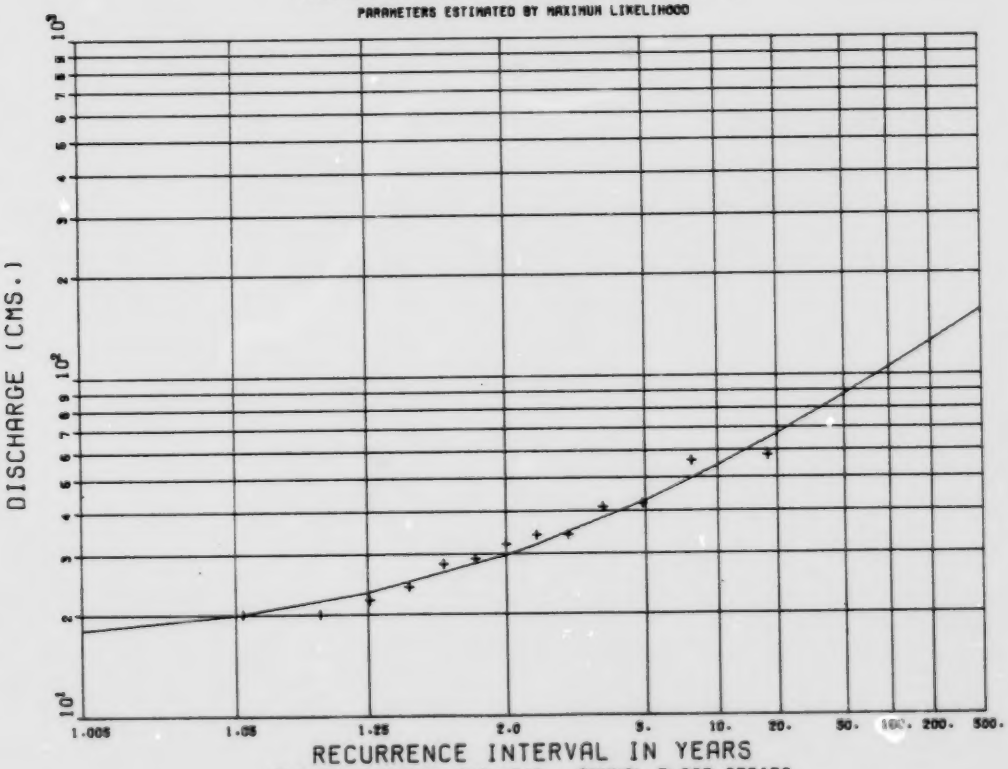
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	13.		13.		18.		0.		14.	
1.050	18.		18.		20.		0.		19.	
1.250	24.		24.		23.		0.		24.	
2.000	32.		32.		30.		0.		31.	
2.330	34.	3.41	34.	9.89	32.	11.30	0.	0.00	33.	10.80
5.000	42.	10.70	43.	11.40	43.	16.20	0.	0.00	43.	12.50
10.000	49.	11.80	50.	13.20	54.	21.80	0.	0.00	51.	15.50
20.000	55.	12.80	57.	15.10	67.	27.80	0.	0.00	59.	19.80
50.000	63.	13.80	66.	17.30	87.	35.80	0.	0.00	70.	26.60
100.000	70.	14.40	73.	18.90	105.	41.80	0.	0.00	79.	32.40
200.000	76.	15.00	79.	20.40	122.	47.50	0.	0.00	88.	38.50
500.000	84.	15.60	86.	22.30	155.	54.70	0.	0.00	102.	46.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

ROOT RIVER AT SAULT STE. MARIE 02CA002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1296.0

ROSEBERRY RIVER ABOVE ROSEBERRY LAKES 04CA003

DRAINAGE AREA : 619.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1989

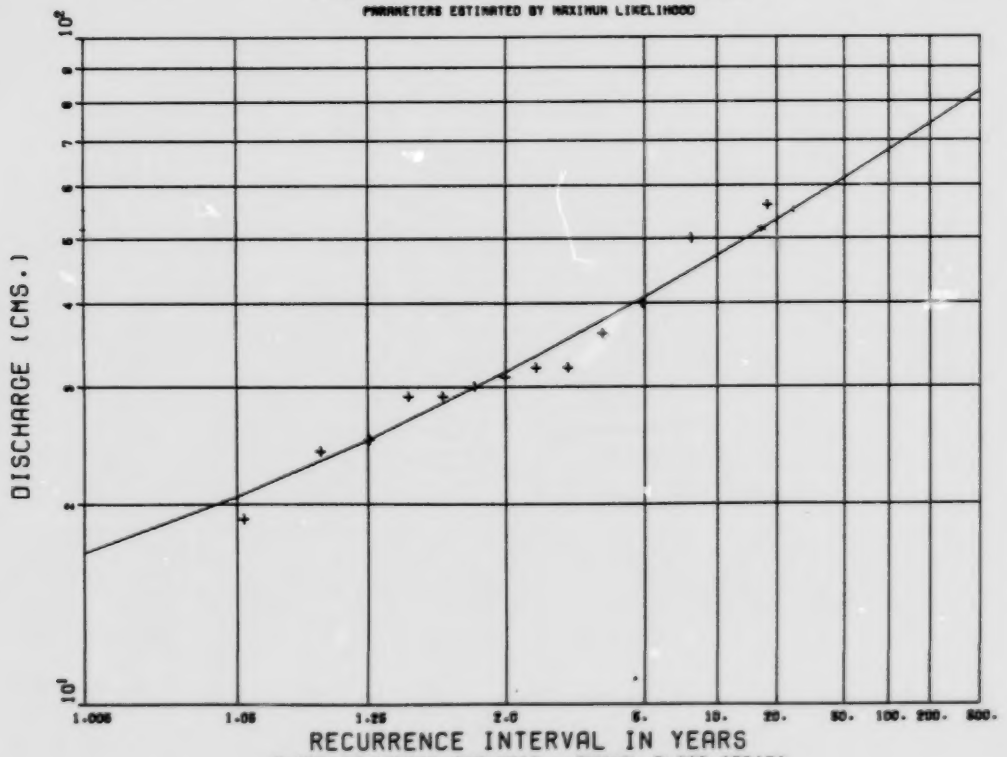
SAMPLE STATISTICS
MEAN = 33. S.D. = 10.3 C.S. = 1.1870 C.K. = 4.9790
SAMPLE STATISTICS (LOGS)
MEAN = 3.4656 S.D. = .2910 C.S. = .3785 C.K. = 4.3294
SAMPLE MIN = 19. SAMPLE MAX = 56. N = 13

PARAMETERS FOR GUMBEL I A = .134346 U = 29.
PARAMETERS FOR LOGNORMAL M = 3.4656 S = .2910
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 9. M = 3.0966 S = .4163
STATISTICS OF LOG(X-A)
MEAN = 3.0966 S.D. = .4163 C.S. = -.0850 C.K. = 4.4817
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0551 B = .2793E+02 LOG(M) = 1.9279
ME= .6075E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0512 B = .2982E+02
LOG(M)F= 1.9381 M = .6946E+01
DISTRIBUTION STATISTICS MEAN = 3.4656 S.D. = .2797 C.S. = .3663

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	17.		15.		17.		17.		17.	
1.050	21.		20.		21.		21.		21.	
1.250	26.		25.		26.		25.		25.	
2.000	32.		32.		32.		32.		31.	
2.330	33.	7.89	34.	8.13	33.	8.81	33.	8.43	33.	8.96
5.000	42.	9.29	41.	9.33	41.	10.40	40.	9.92	42.	10.40
10.000	46.	10.50	47.	10.90	47.	12.80	46.	12.40	47.	13.00
20.000	51.	11.40	52.	12.40	53.	15.90	52.	15.60	53.	16.70
50.000	58.	12.50	58.	14.20	61.	20.40	60.	20.70	62.	22.60
100.000	63.	13.20	63.	15.50	68.	23.90	66.	24.90	69.	27.60
200.000	68.	13.80	68.	16.80	74.	27.40	72.	29.40	75.	32.90
500.000	75.	14.50	74.	18.30	83.	32.00	81.	35.60	85.	40.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ROSEBERRY RIVER ABOVE ROSEBERRY LAKES 04CA003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I297.0

ROUGE RIVER NEAR MARKHAM 02HC022

DRAINAGE AREA : 186.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1965 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	43.	13.	.049	5.226
LN X SERIES	3.71	.34	-1.134	5.875

X(MIN)= 18. CMS. TOTAL SAMPLE SIZE= 18
X(MAX)= 72. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	44.	11.	.359	6.085
LN X SERIES	3.76	.28	-.975	7.279
LN (X-A) SERIES	5.08	.07	.025	5.987

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -116.8511 K = 5.0807 S = .0709

FLOOD FREQUENCY REGIME

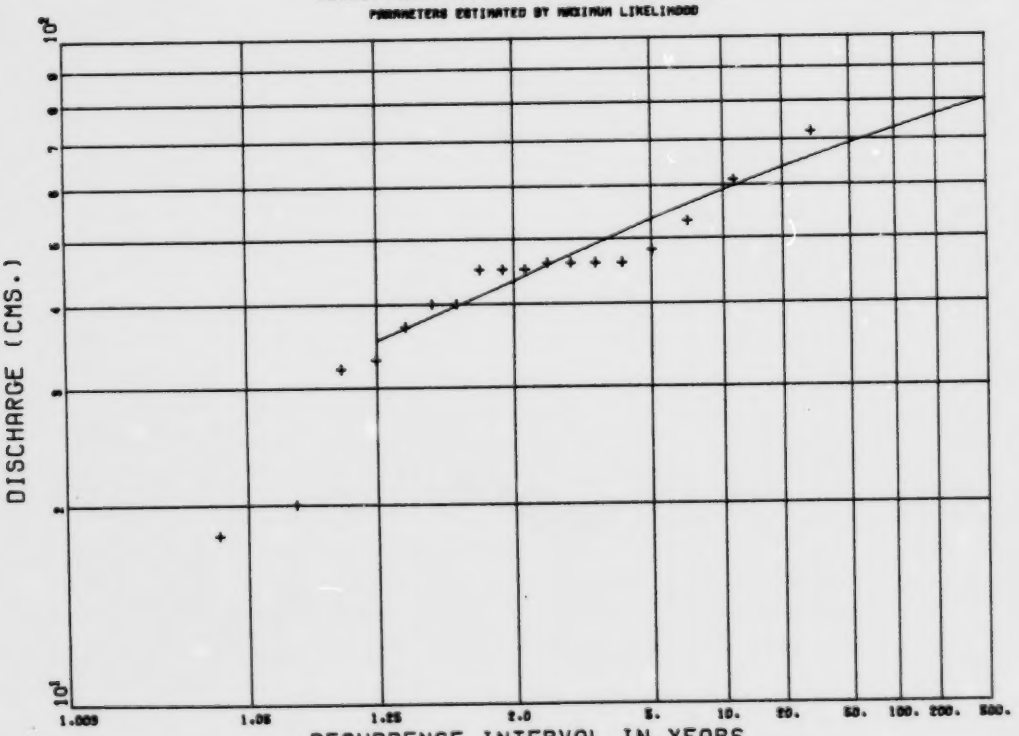
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	35.
2.000	.500	42.
2.330	.429	45.
5.000	.200	53.
10.000	.100	59.
20.000	.050	64.
50.000	.020	69.
100.000	.010	73.
200.000	.005	76.
500.000	.002	80.

ROUGE RIVER NEAR MARKHAM 02HC022

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I298.0

RUSCOM RIVER NEAR RUSCOM STATION 02GH002

DRAINAGE AREA : 125.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1983

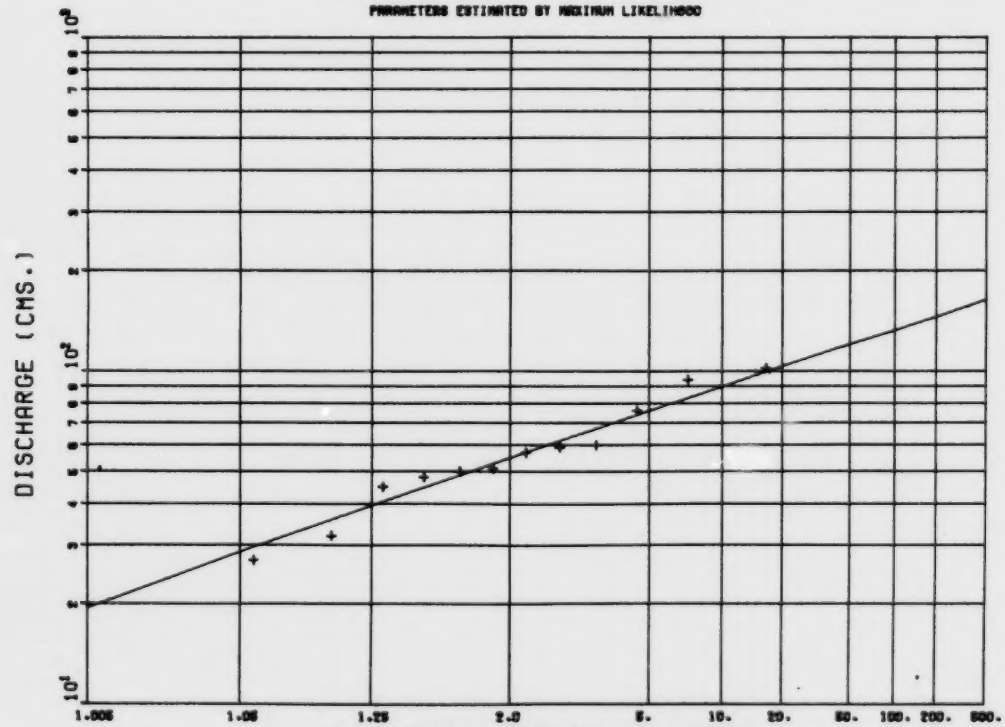
SAMPLE STATISTICS
MEAN = 50. S.D. = 22.5 C.S. = .7573 C.K. = 4.1781
SAMPLE STATISTICS (LOGS)
MEAN = 3.9998 S.D. = .3884 C.S. = -.1281 C.K. = 4.0289
SAMPLE MIN = 27. SAMPLE MAX = 102. N = 12

PARAMETERS FOR GUMBEL I A = .057605 U = 48.
PARAMETERS FOR LOGNORMAL M = 3.9998 S = .3884
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -3. M = 4.0658 S = .3635
STATISTICS OF LOG(X-A)
MEAN = 4.0658 S.D. = .3635 C.S. = -.0664 C.K. = 3.9855
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8249 B = .4343E+03 LOG(M) =18.0626
ME= .2345E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.8334 B = .4341E+03
LOG(M)F= 8.1472 M = .3494E+04
DISTRIBUTION STATISTICS MEAN = 3.9998 S.D. = .3723 C.S. = -.1795

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	19.		20.		19.		20.		19.	
1.050	29.		29.		29.		29.		28.	
1.250	40.		39.		39.		40.		40.	
2.000	55.		55.		55.		55.		55.	
5.333	68.	18.90	69.	11.30	69.	11.90	69.	11.50	69.	12.10
5.000	74.	12.10	76.	13.00	76.	12.80	75.	12.00	76.	12.70
10.000	88.	13.20	90.	15.10	89.	15.10	87.	13.60	89.	14.50
20.000	100.	14.20	103.	17.20	103.	18.20	99.	16.30	102.	17.60
50.000	116.	15.20	121.	19.80	120.	22.70	113.	20.90	118.	22.80
100.000	128.	15.80	135.	21.60	132.	26.20	124.	25.00	130.	27.30
200.000	140.	16.36	148.	23.30	145.	29.70	134.	29.30	142.	32.10
500.000	156.	16.90	167.	25.40	163.	34.30	147.	35.30	157.	38.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

RUSCOM RIVER NEAR RUSCOM STATION 02GH002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I299.0

ST. LAWERENCE RIVER AT CORNWALL 02MC002

DRAINAGE AREA : 774000.0 SQ. KM.
Regulated : unclassified
PERIOD OF RECORD : 1968 - 1981

SAMPLE STATISTICS
MEAN = 8531. S.D. = 655.5 C.S. = .5295 C.K. = 3.4663
SAMPLE STATISTICS (LOGS)
MEAN = 9.0835 S.D. = .0733 C.S. = .3918 C.K. = 3.3950
SAMPLE MIN = 7939. SAMPLE MAX = 9972. N = 14

PARAMETERS FOR GUMBEL I A = .001897 U = 8531.
PARAMETERS FOR LOGNORMAL M = 9.0835 S = .0733
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 6706. M = 7.6171 S = .3111
STATISTICS OF LOG(X-A)
MEAN = 7.6171 S.D. = .3111 C.S. = -.0844 C.K. = 3.3532
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0144 B = .2505E+02 LOG(M) = 8.7092
ME= .6058E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0304 B = .5815E+01
LOG(M)F= 8.9069 M = .7363E+04
DISTRIBUTION STATISTICS MEAN = 9.0835 S.D. = .0732 C.S. = .8293

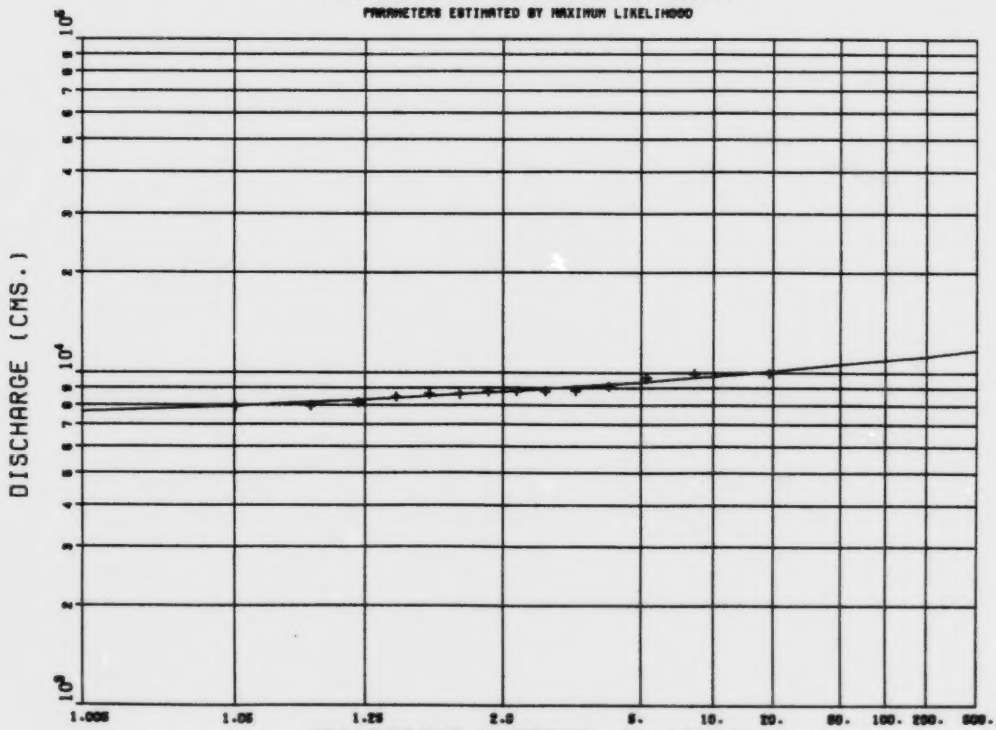
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	7650.		7290.		7620.		7710.		7490.	
1.050	7940.		7810.		7920.		7960.		7880.	
1.250	8280.		8280.		8270.		8270.		8270.	
2.000	8720.		8810.		8740.		8720.		8770.	
2.330	8840.	2.02	8920.	1.98	8850.	2.16	8830.	2.07	8880.	2.18
5.000	9120.	2.72	9370.	2.28	9150.	2.74	9320.	2.74	9350.	2.52
10.000	9720.	3.35	9680.	2.65	9730.	3.59	9710.	3.62	9700.	3.17
20.000	10100.	3.95	9940.	3.01	10100.	4.69	10100.	4.66	10000.	4.18
50.000	10600.	4.63	10200.	3.46	10600.	6.42	10600.	6.20	10400.	5.54
100.000	11000.	5.20	10400.	3.77	10900.	7.67	10900.	7.44	10700.	6.76
200.000	11300.	5.69	10600.	4.07	11200.	9.41	11300.	8.74	10900.	8.05
500.000	11800.	6.29	10900.	4.45	11700.	11.60	11700.	10.50	11300.	9.46

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

ST. LAWERENCE RIVER AT CORNWALL 02MC002

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I300.0

ST. LAWERENCE RIVER AT IROQUOIS (1938-58) 02MB005

DRAINAGE AREA = 772000.0 SQ. KM.
Regulated : Unclassified
PERIOD OF RECORD = 1938 - 1958

SAMPLE STATISTICS
MEAN = 7882. S.D. = 692.5 C.S. = -.0139 C.K. = 2.5792
SAMPLE STATISTICS (LOGS)
MEAN = 8.9687 S.D. = .0884 C.S. = -.1477 C.K. = 2.5047
SAMPLE MIN = 6802. SAMPLE MAX = 9180. N = 21

PARAMETERS FOR GUMBEL I A = .011619 U = 7545.
PARAMETERS FOR LOGNORMAL M = 8.9687 S = .0884

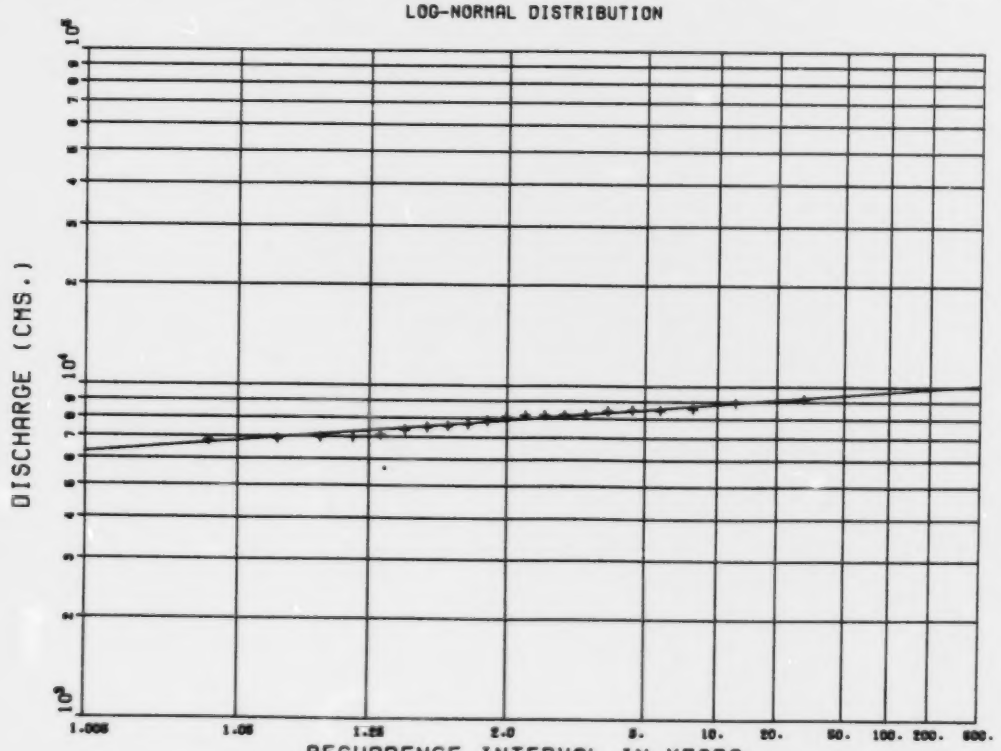
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0065 B = .1835E+03 LOG(P) =10.1662
ME= .2601E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0192 B = .1994E+02
LOG(M)= 9.3562 M = .1159E+05
DISTRIBUTION STATISTICS MEAN = 8.9687 S.D. = .0872 C.S. = -.4479

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6510.		6250.		0.		6050.		6180.	
1.050	6860.		6790.		0.		6730.		6770.	
1.250	7250.		7290.		0.		7320.		7300.	
2.000	7770.		7850.		0.		7900.		7870.	
5.330	7900.	2.16	7980.	1.94	0.	0.00	8020.	1.98	7990.	2.08
5.000	8470.	3.87	8460.	2.25	0.	0.00	8450.	1.95	8464.	2.17
10.000	8930.	4.49	8800.	2.60	0.	0.00	8740.	2.09	8780.	2.48
20.000	9380.	4.06	9080.	2.96	0.	0.00	8960.	2.39	9050.	2.99
50.000	9950.	4.76	9420.	3.40	0.	0.00	9200.	2.97	9350.	3.88
100.000	10400.	5.24	9650.	3.71	0.	0.00	9350.	3.50	9550.	4.65
200.000	10800.	5.69	9860.	4.01	0.	0.00	9480.	4.07	9740.	5.47
500.000	11400.	6.24	10100.	4.38	0.	0.00	9640.	4.87	9970.	6.61

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT

ST. LAWERENCE RIVER AT IROQUOIS (1938-58) 02MB005

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE = I301.0
I-316

SACHIGO RIVER BELOW BEAVESTONE RIVER 04CD001

DRAINAGE AREA = 21100.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1977

SAMPLE STATISTICS
MEAN = 682. S.D. = 296.7 C.S. = .7992 C.K. = 3.6548
SAMPLE STATISTICS (LOGS)
MEAN = 6.4421 S.D. = .4243 C.S. = .2365 C.K. = 3.1643
SAMPLE MIN = 348. SAMPLE MAX = 1192. N = 11

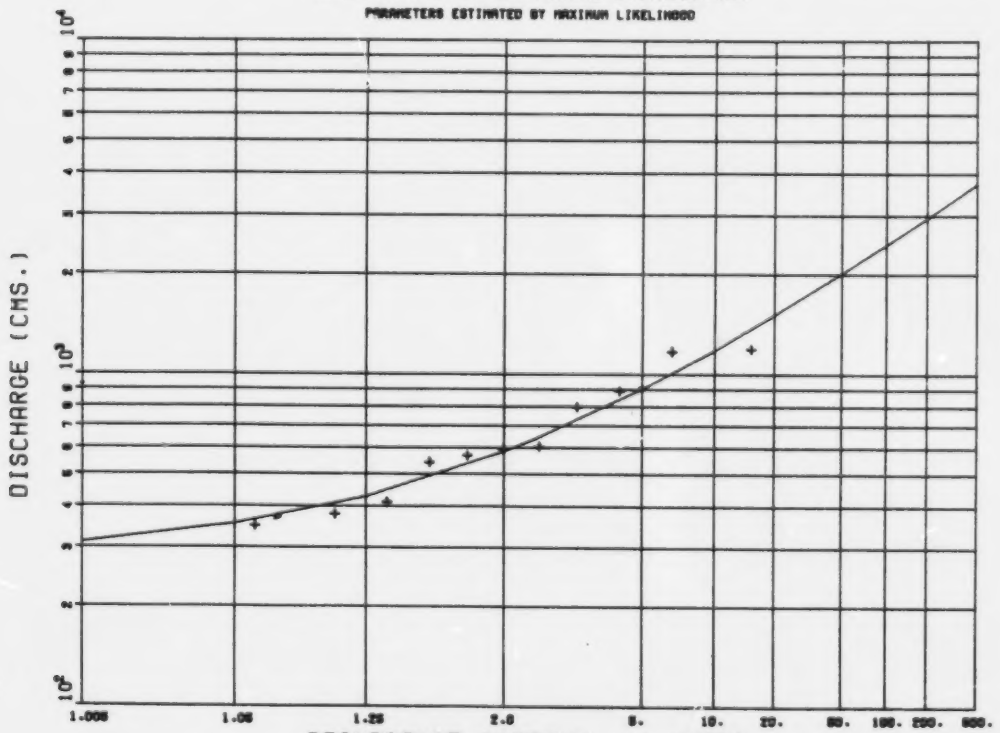
PARAMETERS FOR GUMBEL I A = .004308 U = 552.
PARAMETERS FOR LOGNORMAL M = 6.4421 S = .4243
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 275. M = 5.7269 S = .8390
STATISTICS OF LOG(X-A)
MEAN = 5.7269 S.D. = .8390 C.S. = -.3586 C.K. = 3.3750
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0502 M = .7149E+02 LOG(M) = 2.8544
ME= .1736E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	197.		210.		310.		0.		231.	
1.050	315.		312.		352.		0.		325.	
1.250	451.		439.		426.		0.		447.	
2.000	631.		628.		582.		0.		617.	
2.330	675.	12.00	677.	12.90	631.	14.80	0.	0.00	666.	14.00
5.000	870.	13.30	897.	14.90	897.	20.40	0.	0.00	892.	15.90
10.000	1030.	14.40	1080.	17.30	1170.	26.80	0.	0.00	1090.	19.50
20.000	1180.	15.30	1260.	19.60	1501.	33.60	0.	0.00	1290.	24.60
50.000	1380.	16.30	1500.	22.60	2003.	42.50	0.	0.00	1580.	32.70
100.000	1530.	16.90	1680.	24.60	2442.	49.00	0.	0.00	1810.	39.60
200.000	1680.	17.50	1870.	26.60	2940.	55.30	0.	0.00	2060.	46.90
500.000	1870.	18.00	2130.	29.00	3720.	63.10	0.	0.00	2410.	56.90

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SACHIGO RIVER BELOW BEAVESTONE RIVER 04CD001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I302.0

SACHIGO RIVER BELOW OUTLET OF SACHIGO LAKE 04CD002

DRAINAGE AREA = 4270.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1982

SAMPLE STATISTICS
MEAN = 71. S.D. = 28.5 C.S. = .4905 C.K. = 2.9054
SAMPLE STATISTICS (LOGS)
MEAN = 4.2065 S.D. = .3700 C.S. = .1894 C.K. = 2.7044
SAMPLE MIN = 41. SAMPLE MAX = 111. N = 10

PARAMETERS FOR GUMBEL I A = .050737 U = 59.
PARAMETERS FOR LOGNORMAL M = 4.2065 S = .3700
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 36. M = 3.2301 S = .9322
STATISTICS OF LOG(X-A)
MEAN = 3.2301 S.D. = .9322 C.S. = -.4182 C.K. = 3.4164
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0350 B = .1115E+03 LOG(M) = .2989
ME= .1348E+01

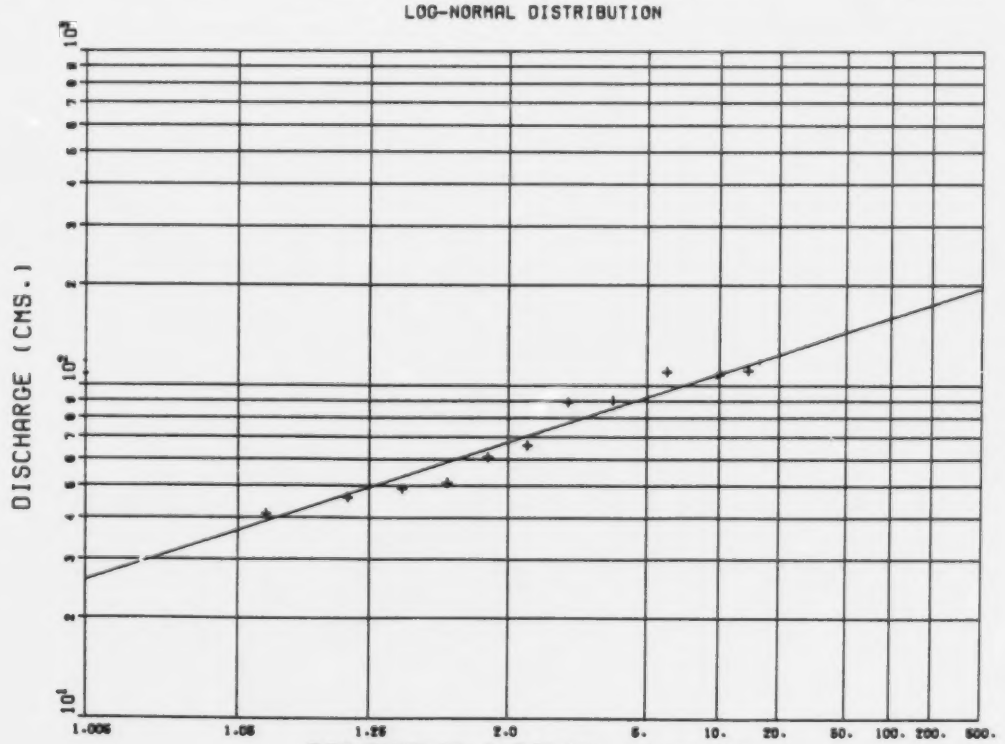
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	27.		26.		38.		0.		28.	
1.050	38.		37.		42.		0.		37.	
1.250	50.		49.		48.		0.		49.	
2.000	67.		67.		61.		0.		66.	
2.330	71.	11.20	72.	11.80	66.	13.70	0.	0.00	71.	12.80
5.000	89.	12.60	92.	13.60	92.	20.80	0.	0.00	91.	14.40
10.000	104.	13.90	108.	15.80	120.	28.40	0.	0.00	109.	17.50
20.000	118.	14.90	123.	17.90	153.	36.40	0.	0.00	126.	21.90
50.000	136.	16.10	144.	20.60	208.	46.90	0.	0.00	149.	29.00
100.000	150.	16.80	159.	22.20	257.	54.40	0.	0.00	167.	35.00
200.000	164.	17.40	174.	24.30	315.	61.60	0.	0.00	186.	41.40
500.000	182.	18.10	195.	26.50	407.	70.50	0.	0.00	212.	50.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SACHIGO RIVER BELOW OUTLET OF SACHIGO LAKE 04CD002

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I303.0

SALMON RIVER NEAR SHANNONVILLE 02HM003

DRAINAGE AREA : 891.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1959 - 1982

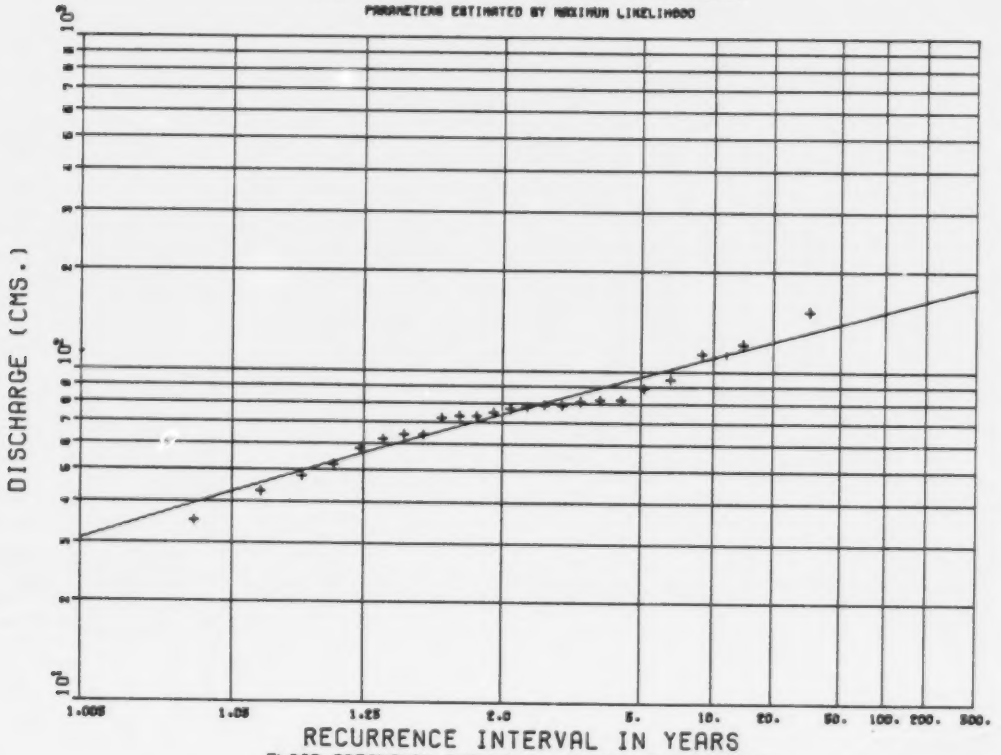
SAMPLE STATISTICS
MEAN = 77. S.D. = 25.3 C.S. = 1.1516 C.K. = 5.8933
SAMPLE STATISTICS (LOGS)
MEAN = 4.2940 S.D. = .3214 C.S. = -.0941 C.K. = 4.3238
SAMPLE MIN = 35. SAMPLE MAX = 152. N = 24

PARAMETERS FOR GUMBEL I A = .049927 U = 66.
PARAMETERS FOR LOGNORMAL P = 4.2940 S = .3214
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -9. M = 4.4125 S = .2852
STATISTICS OF LOG(X-A)
MEAN = 4.4125 S.D. = .2852 C.S. = .0421 C.K. = 4.3164
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0151 B = .4517E+03 LOG(M) =11.1259
ME= .6791E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0102 B = .9536E+03
LOG(M)F=14.0103 M = .1215E+07
DISTRIBUTION STATISTICS MEAN = 4.2940 S.D. = .3146 C.S. = -.0648

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	32.		32.		31.		32.		31.	
1.050	43.		43.		43.		43.		43.	
1.250	56.		56.		56.		56.		56.	
2.000	73.		73.		74.		74.		74.	
5.000	77.	6.71	78.	6.61	78.	6.54	78.	6.93	78.	7.08
10.000	96.	7.69	96.	7.64	96.	7.40	96.	7.38	96.	7.48
20.000	111.	8.53	111.	8.86	110.	8.71	109.	8.57	110.	8.64
50.000	125.	9.23	124.	10.10	123.	10.50	122.	10.40	123.	10.50
100.000	144.	9.99	142.	11.60	139.	13.20	138.	13.50	139.	13.60
200.000	158.	10.50	155.	12.60	151.	15.30	150.	16.20	151.	16.30
500.000	172.	10.90	168.	13.60	163.	17.40	162.	19.10	163.	19.20
	190.	11.30	185.	14.90	179.	20.20	177.	23.00	178.	23.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SALMON RIVER NEAR SHANNONVILLE 02HM003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I304.0

SAUBLE RIVER AT SAUBLE FALLS 02FA001

DRAINAGE AREA = 927.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1958 - 1982

SAMPLE STATISTICS
MEAN = 126. S.D. = 39.6 C.S. = -.0278 C.K. = 2.4948
SAMPLE STATISTICS (LOGS)
MEAN = 4.8044 S.D. = .3372 C.S. = -.5867 C.K. = 3.0288
SAMPLE MIN = 60. SAMPLE MAX = 203. N = 25

PARAMETERS FOR GUMBEL I A = .027777 U = 109.
PARAMETERS FOR LOGNORMAL P = 4.8044 S = .3372

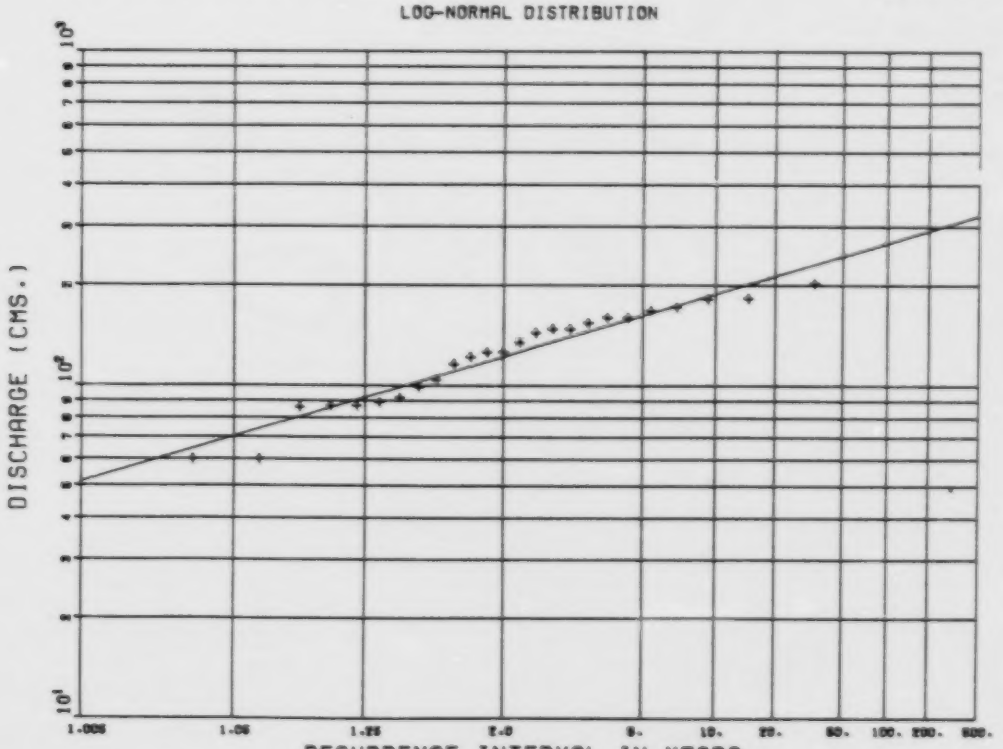
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8589 B = .1162E+02 LOG(P) = 5.9539
ME= .3853E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.7059 B = .2886E+01
LOG(M)F= 5.9987 M = .1211E+03
DISTRIBUTION STATISTICS MEAN = 4.8044 S.D. = .3498 C.S. =-1.1772

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD LOG PEARSON III		MOMENTS LOG PEARSON III	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	49.		51.		0.		34.		43.	
1.050	69.		70.		0.		63.		67.	
1.250	92.		92.		0.		95.		93.	
2.000	122.		122.		0.		130.		126.	
2.330	130.	7.03	130.	6.80	0.	0.00	138.	6.20	134.	7.26
5.000	163.	7.96	162.	7.85	0.	0.00	164.	5.21	163.	6.60
10.000	190.	8.76	188.	9.10	0.	0.00	179.	4.69	183.	7.00
20.000	216.	9.43	213.	10.30	0.	0.00	189.	4.33	200.	8.51
50.000	250.	10.10	244.	11.90	0.	0.00	199.	4.12	219.	11.60
100.000	275.	10.60	267.	13.00	0.	0.00	205.	4.16	231.	14.20
200.000	300.	11.00	291.	14.00	0.	0.00	209.	4.35	242.	17.00
500.000	333.	11.40	322.	15.30	0.	0.00	213.	4.76	256.	20.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SAUBLE RIVER AT SAUBLE FALLS 02FA001

LOG-NORMAL DISTRIBUTION



RECURRENCE INTERVAL IN YEARS

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1305.0

SAUGEEN RIVER NEAR PORT ELGIN 02FC001

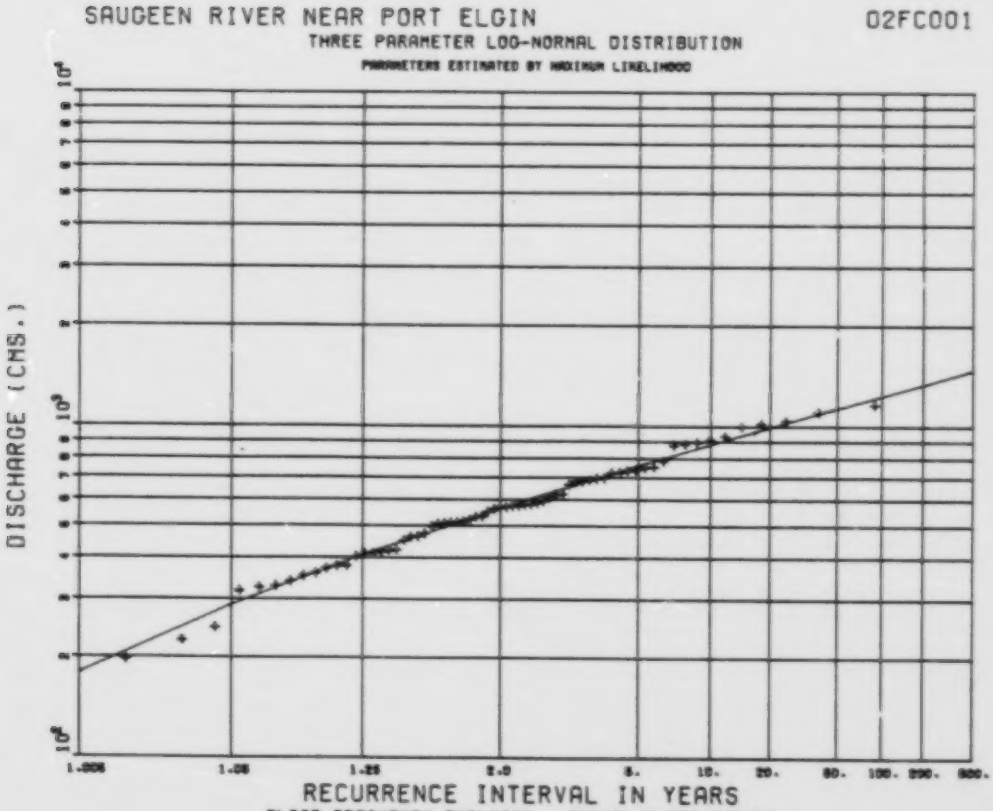
DRAINAGE AREA = 3960.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1916 - 1982

SAMPLE STATISTICS
MEAN = 589. S.D. = 216.1 C.S. = .6520 C.K. = 3.2284
SAMPLE STATISTICS (LOGS)
MEAN = 6.3113 S.D. = .3781 C.S. = -.3198 C.K. = 3.2482
SAMPLE MIN = 197. SAMPLE MAX = 1162. N = 67

PARAMETERS FOR GUMBEL I A = .805614 U = 489.
PARAMETERS FOR LOGNORMAL P = 6.3113 S = .3781
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -194. M = 6.6272 S = .2736
STATISTICS OF LOG(X-A)
MEAN = 6.6272 S.D. = .2736 C.S. = -.0242 C.K. = 2.9322
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0683 B = .3931E+02 LOG(M) = 8.6819
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .5895E+04
A = -.0688 B = .2983E+02
LOG(M)F= 8.3650 M = .4294E+04
DISTRIBUTION STATISTICS MEAN = 6.3113 S.D. = .3760 C.S. = -.3662

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	192.		208.		173.		184.		186.	
1.050	291.		296.		267.		286.		286.	
1.250	404.		401.		406.		405.		404.	
2.000	554.		551.		561.		563.		562.	
2.330	592.	4.66	589.	4.66	599.	4.74	602.	4.83	600.	4.96
5.000	756.	5.19	757.	5.38	757.	4.89	759.	4.83	76?.	4.93
10.000	890.	5.65	894.	6.23	878.	5.66	877.	5.27	881.	5.46
20.000	1020.	6.05	1030.	7.09	991.	6.72	981.	6.12	989.	6.54
50.000	1180.	6.46	1200.	8.15	1130.	8.34	1110.	7.71	1120.	8.62
100.000	1310.	6.72	1330.	8.89	1230.	9.61	1190.	9.13	1210.	10.30
200.000	1430.	6.94	1460.	9.60	1330.	10.98	1280.	10.70	1300.	12.10
500.000	1600.	7.19	1640.	10.50	1470.	12.68	1380.	12.80	1420.	14.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I306.0

SAUGEEN RIVER NEAR WALKERTON 02FC002

DRAINAGE AREA = 2150.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1916 - 1982

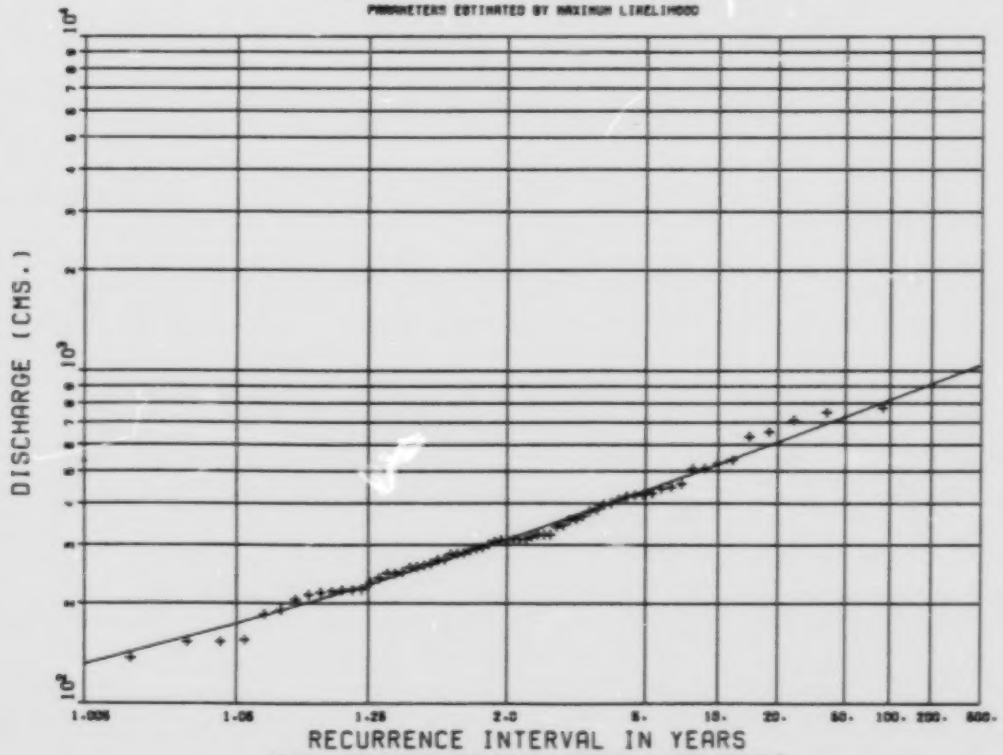
SAMPLE STATISTICS
MEAN = 340. S.D. = 148.2 C.S. = 1.3062 C.K. = 4.8665
SAMPLE STATISTICS (LOGS)
MEAN = 5.7548 S.D. = .3830 C.S. = .2478 C.K. = 3.1753
SAMPLE MIN = 137. SAMPLE MAX = 774. N = 67

PARAMETERS FOR GUMBEL I A = .010887 U = 280.
PARAMETERS FOR LOGNORMAL P = 5.7548 S = .3830
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 54. M = 5.5497 S = .4677
STATISTICS OF LOG(X-A)
MEAN = 5.5497 S.D. = .4677 C.S. = -.8085 C.K. = 3.2269
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8475 B = .6514E+02 LOG(M) = 2.6634
ME= .1434E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .9487 B = .6093E+02
LOG(P)F= 2.7866 M = .1623E+02
DISTRIBUTION STATISTICS MEAN = 5.7548 S.D. = .3803 C.S. = .2562

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	113.		118.		131.		130.		129.	
1.050	168.		168.		173.		174.		173.	
1.250	232.		229.		227.		228.		228.	
2.000	319.		316.		311.		311.		311.	
2.500	337.	4.59	338.	4.72	333.	5.08	332.	5.05	333.	5.14
5.000	429.	5.12	436.	5.45	435.	5.83	432.	5.75	433.	5.83
10.000	504.	5.60	516.	6.32	522.	7.12	519.	7.11	521.	7.16
20.000	576.	5.99	593.	7.18	609.	8.69	606.	8.92	608.	9.04
50.000	669.	6.41	693.	8.25	726.	10.90	726.	11.80	729.	12.10
100.000	739.	6.68	778.	9.01	817.	12.70	821.	14.20	825.	14.60
200.000	809.	6.90	867.	9.72	912.	14.40	922.	16.70	926.	17.30
500.000	900.	7.15	951.	10.60	1040.	16.60	1060.	20.20	1070.	21.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SAUGEEN RIVER NEAR WALKERTON 02FC002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I307.0

SCHNEIDER CREEK AT KITCHENER 02GA037

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 25.1 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1983

SAMPLE STATISTICS
MEAN = 1818. S.D. = 938.9 C.S. = 1.2699 C.K. = 6.1510
SAMPLE STATISTICS (LOGS)
MEAN = 7.3915 S.D. = .4986 C.S. = .1831 C.K. = 3.7888
SAMPLE MIN = 716. SAMPLE MAX = 4100. N = 12

PARAMETERS FOR GUMBEL I A = .001529 U = 1428.
PARAMETERS FOR LOGNORMAL M = 7.3915 S = .4986
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 314. M = 7.1387 S = .6377
STATISTICS OF LOG(X-A)
MEAN = 7.1387 S.D. = .6377 C.S. = -.1786 C.K. = 3.7123
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0257 B = .3767E+03 LOG(M) =-2.2847
ME= .1818E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0462 B = .1071E+03
LOG(M)F= 2.4419 M = .1149E+02
DISTRIBUTION STATISTICS MEAN = 7.3915 S.D. = .4782 C.S. = .1932

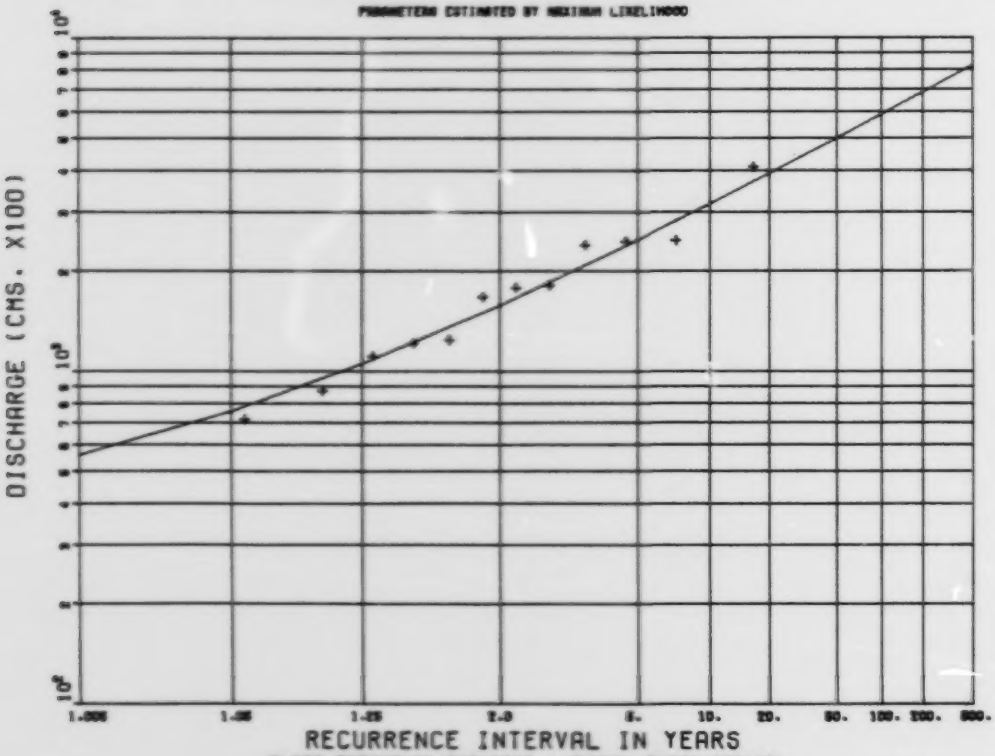
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	328.		449.		558.		516.		471.	
1.050	691.		714.		755.		759.		725.	
1.250	1110.		1070.		1050.		1080.		1060.	
2.000	1660.		1620.		1570.		1600.		1610.	
2.330	1880.	13.30	1770.	14.50	1730.	15.00	1740.	15.00	1760.	15.70
5.000	2400.	14.20	2470.	16.80	2470.	18.70	2410.	17.00	2460.	17.30
10.000	2890.	15.10	3070.	19.40	3170.	23.00	3020.	20.60	3090.	20.70
20.000	3360.	15.90	3680.	22.10	3910.	28.00	3650.	25.70	3740.	25.70
50.000	3970.	16.70	4520.	25.40	4980.	34.70	4550.	33.90	4640.	33.80
100.000	4430.	17.20	5170.	27.70	5870.	39.70	5260.	40.00	5370.	40.60
200.000	4880.	17.70	5860.	29.90	6830.	44.00	6760.	48.00	6150.	47.90
500.000	5480.	18.10	6820.	32.70	8220.	50.90	7200.	58.10	7260.	57.90

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT

SCHNEIDER CREEK AT KITCHENER 02GA037

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I308.0

SCHOMBERB RIVER NEAR SCHOMBERG 02EC010

DRAINAGE AREA = 42.9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

SAMPLE STATISTICS
MEAN = 10. S.D. = 2.9 C.S. = -.0272 C.K. = 2.4175
SAMPLE STATISTICS (LOGS)
MEAN = 2.2859 S.D. = .3032 C.S. = -.3687 C.K. = 2.5366
SAMPLE MIN = 6. SAMPLE MAX = 15. N = 16

PARAMETERS FOR GUMBEL I A = .398722 U = 9.
PARAMETERS FOR LOGNORMAL M = 2.2859 S = .3032

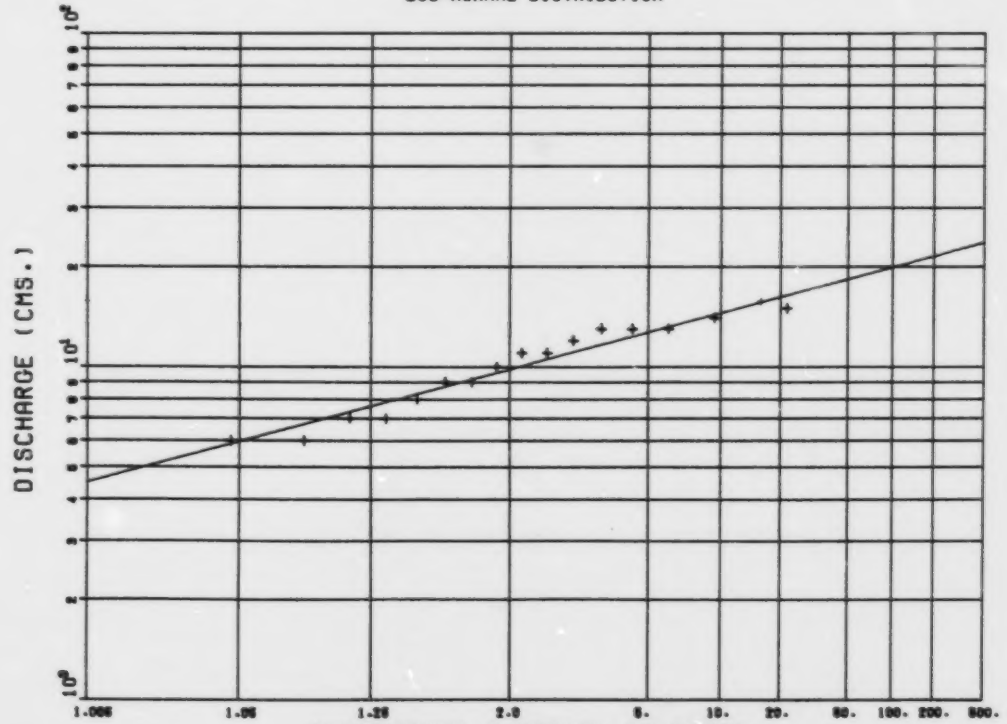
NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8559 B = .2942E+02 LOG(M) = 3.9306
ME= .5094E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2506 B = .1820E+01
LOG(M)F= 2.7421 M = .1552E+02
DISTRIBUTION STATISTICS MEAN = 2.2859 S.D. = .3381 C.S. = -1.4823

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	5.		5.		0.		3.		4.	
1.050	6.		6.		0.		5.		6.	
1.250	8.		8.		0.		8.		8.	
2.000	10.		10.		0.		11.		10.	
5.000	13.	7.87	14.	7.64	0.	0.00	13.	0.00	14.	8.14
10.000	15.	10.10	15.	9.62	0.	0.00	14.	0.00	15.	9.98
20.000	16.	11.00	16.	11.20	0.	0.00	14.	0.00	14.	8.75
50.000	19.	12.00	18.	11.60	0.	0.00	15.	0.00	16.	10.50
100.000	21.	12.80	20.	13.40	0.	0.00	15.	0.00	17.	13.70
200.000	23.	13.60	22.	14.60	0.	0.00	15.	0.00	18.	16.60
500.000	25.	13.60	24.	15.80	0.	0.00	15.	0.00	19.	19.60
			24.	17.20	0.	0.00	15.	0.00	21.	23.80

F.E. = FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SCHOMBERB RIVER NEAR SCHOMBERG 02EC010

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I309.0

SEINE RIVER AT STURGEON FALLS GEN. STATION 05PB009

DRAINAGE AREA : 5880.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1964 - 1992

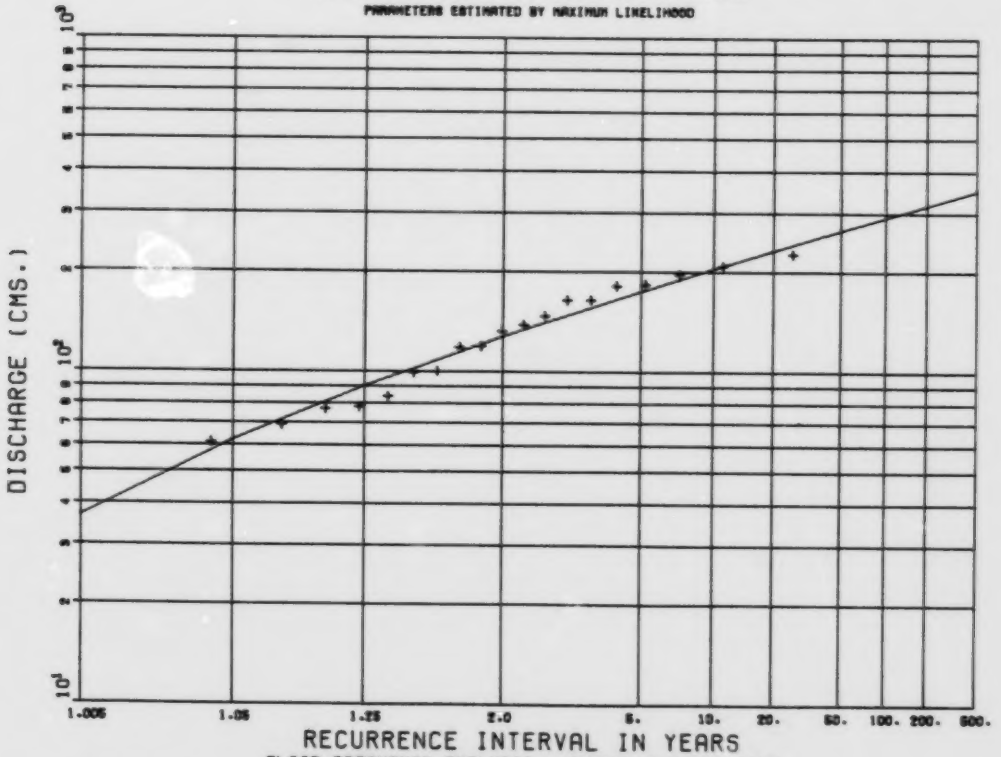
SAMPLE STATISTICS
MEAN = 134. S.D. = 58.4 C.S. = .2388 C.K. = 2.4669
SAMPLE STATISTICS (LOGS)
MEAN = 4.8248 S.D. = .3996 C.S. = -.2646 C.K. = 2.4458
SAMPLE MIN = 61. SAMPLE MAX = 226. N = 19

PARAMETERS FOR GUMBEL I A = .023840 U = 110.
PARAMETERS FOR LOGNORMAL M = 4.8248 S = .3996
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -47. M = 5.1600 S = .2851
STATISTICS OF LOG(X-A)
MEAN = 5.1600 S.D. = .2851 C.S. = -.1241 C.K. = 2.3687
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0529 B = .5714E+02 LOG(M) = 7.8452
ME= .2554E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2901 B = .2729E+01
LOG(M)= 5.5346 M = .2533E+03
DISTRIBUTION STATISTICS MEAN = 4.8248 S.D. = .4297 C.S. =-1.2107

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	40.		45.		37.		26.		40.	
1.050	63.		65.		62.		55.		63.	
1.250	90.		89.		90.		91.		90.	
2.000	125.		125.		127.		135.		127.	
5.330	154.	9.09	154.	9.24	156.	9.42	165.	8.65	156.	9.85
5.000	173.	10.00	174.	10.70	174.	9.67	179.	7.19	175.	9.96
10.000	204.	10.90	208.	12.40	204.	11.10	198.	6.44	205.	11.10
20.000	235.	11.60	240.	14.10	231.	13.20	213.	5.87	233.	13.30
50.000	274.	12.40	283.	16.20	266.	16.40	226.	5.45	267.	17.30
100.000	303.	12.80	316.	17.60	291.	18.80	233.	5.39	292.	20.80
200.000	332.	13.20	349.	19.00	316.	21.30	238.	5.55	316.	24.60
500.000	371.	13.70	394.	20.80	349.	24.50	244.	5.98	347.	29.70

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SEINE RIVER AT STURGEON FALLS GEN. STATION 05PB009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I310.0

SERPENT RIVER AT HIGHWAY NO.17 02CD001

DRAINAGE AREA = 1350.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

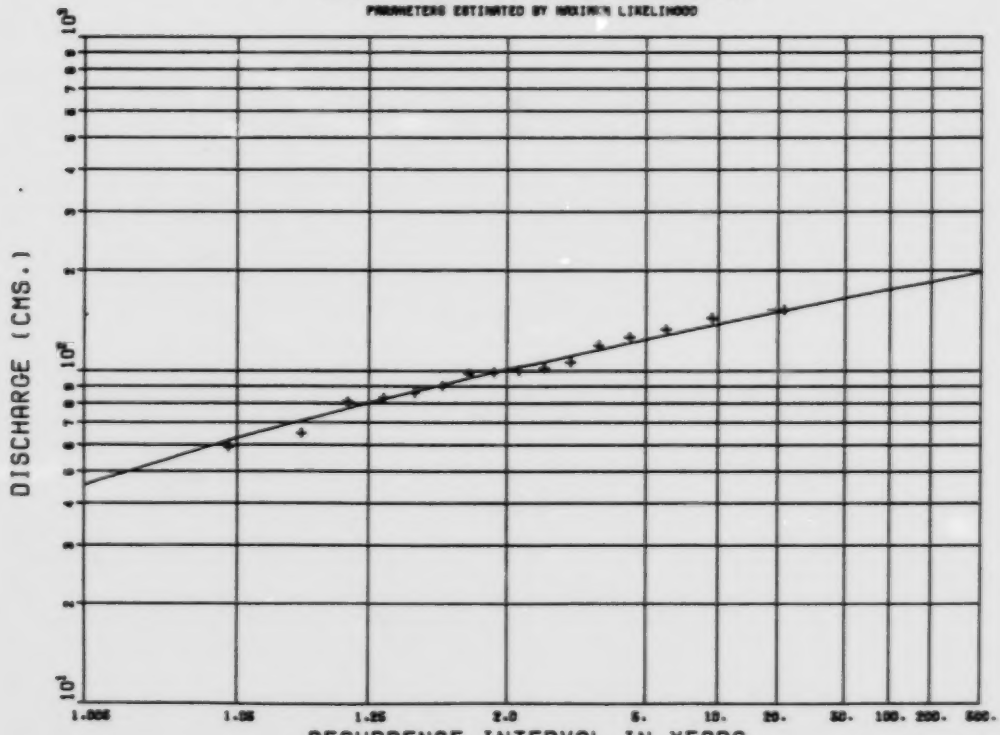
SAMPLE STATISTICS
MEAN = 103. S.D. = 26.5 C.S. = .3012 C.K. = 3.2589
SAMPLE STATISTICS (LOGS)
MEAN = 4.5995 S.D. = .2651 C.S. = -.2722 C.K. = 3.4883
SAMPLE MIN = 59. SAMPLE MAX = 152. N = 16

PARAMETERS FOR GUMBEL I A = .043948 U = 98.
PARAMETERS FOR LOGNORMAL M = 4.5995 S = .2651
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -63. M = 5.8957 S = .1606
STATISTICS OF LOG(X-A)
MEAN = 5.8957 S.D. = .1606 C.S. = .8365 C.K. = 3.3615
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8361 B = .5400E+02 LOG(M) = 6.5475
ME= .6975E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.8619 B = .1752E+02
LOG(PIF= 5.6845 M = .2543E+03
DISTRIBUTION STATISTICS MEAN = 4.5995 S.D. = .2592 C.S. = -.4778

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	52.		58.		45.		45.		47.	
1.053	65.		64.		63.		63.		63.	
1.250	79.		80.		80.		81.		80.	
2.000	99.		99.		101.		101.		101.	
2.330	103.	6.98	104.	6.68	105.	6.89	106.	6.72	105.	7.12
5.000	124.	8.24	124.	7.71	124.	7.04	124.	6.56	125.	7.18
10.000	141.	9.30	140.	8.94	138.	8.06	136.	6.98	138.	8.02
20.000	158.	10.20	154.	10.20	150.	9.59	147.	7.94	151.	9.61
50.000	179.	11.20	171.	11.70	165.	12.00	158.	9.83	165.	12.50
100.000	195.	11.80	184.	12.80	175.	13.90	166.	11.50	175.	15.00
200.000	211.	12.30	197.	13.80	184.	15.90	173.	13.40	184.	17.70
500.000	232.	12.90	213.	15.80	197.	18.50	181.	16.00	196.	21.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SERPENT RIVER AT HIGHWAY NO.17 02CD001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1311.0

SEVERN RIVER AT SWIFT RAPID 02EC003

DRAINAGE AREA : 5850.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1965 - 1982

SAMPLE STATISTICS
MEAN = 226. S.D. = 24.3 C.S. = -.0577 C.K. = 2.8240
SAMPLE STATISTICS (LOGS)
MEAN = 5.3961 S.D. = .1111 C.S. = -.2534 C.K. = 2.9162
SAMPLE MIN = 180. SAMPLE MAX = 263. N = 18

PARAMETERS FOR GUMBEL I A = .045012 U = 210.
PARAMETERS FOR LOGNORMAL M = 5.3961 S = .1111

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0141 B = .6231E+02 LOG(M) = 6.2734

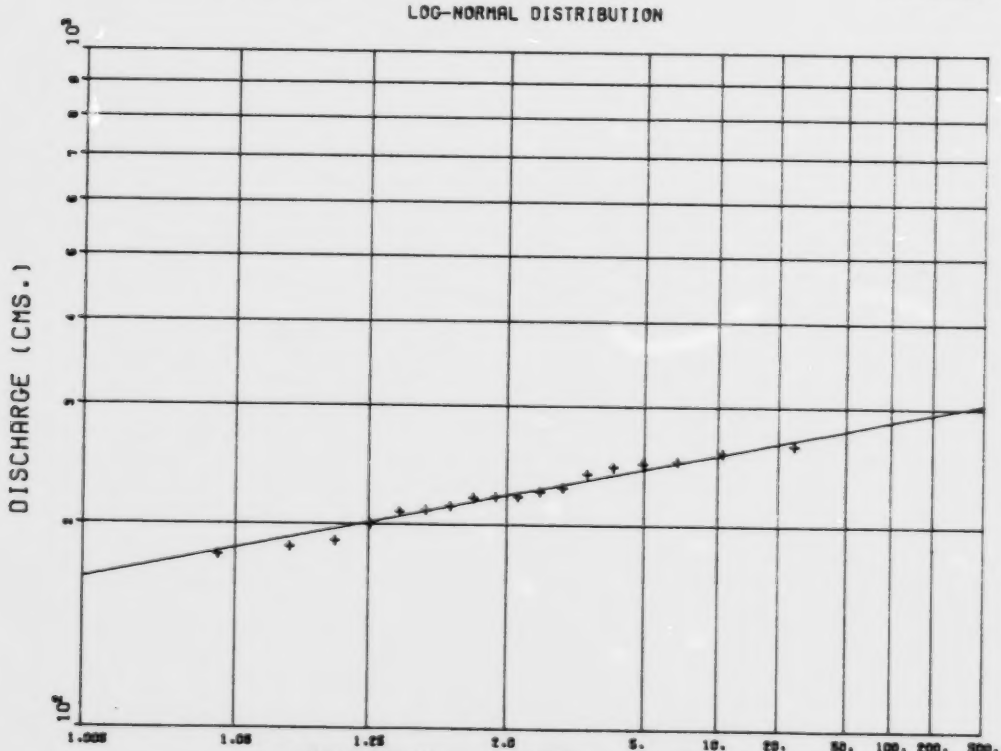
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .5303E+03
A = -.3395 B = .7333E+01
LOG(M)F= 5.7094 M = .3017E+03
DISTRIBUTION STATISTICS MEAN = 5.3961 S.D. = .1112 C.S. = -.7101

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	173.		166.		0.		154.		161.	
1.050	185.		184.		0.		190.		182.	
1.250	199.		201.		0.		202.		201.	
2.000	218.		221.		0.		223.		222.	
2.330	223.	2.98	225.	2.64	0.	1.00	229.	2.62	226.	2.82
5.000	243.	3.88	242.	3.05	0.	0.00	243.	2.44	245.	2.85
10.000	260.	4.66	254.	3.54	0.	0.00	252.	2.45	253.	3.20
20.000	276.	5.37	265.	4.02	0.	0.00	258.	2.64	263.	3.94
50.000	297.	6.21	277.	4.62	0.	0.00	265.	3.10	273.	4.98
100.000	312.	6.78	286.	5.04	0.	0.00	270.	3.56	280.	5.98
200.000	328.	7.30	294.	5.44	0.	0.00	273.	4.09	286.	7.06
500.000	348.	7.93	304.	5.94	0.	0.00	277.	4.83	294.	8.54

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SEVERN RIVER AT SWIFT RAPID 02EC003

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I312.0

SEVERN RIVER BELOW OUTLET OF DEER LAKE 04CA004

DRAINAGE AREA : 8.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1982

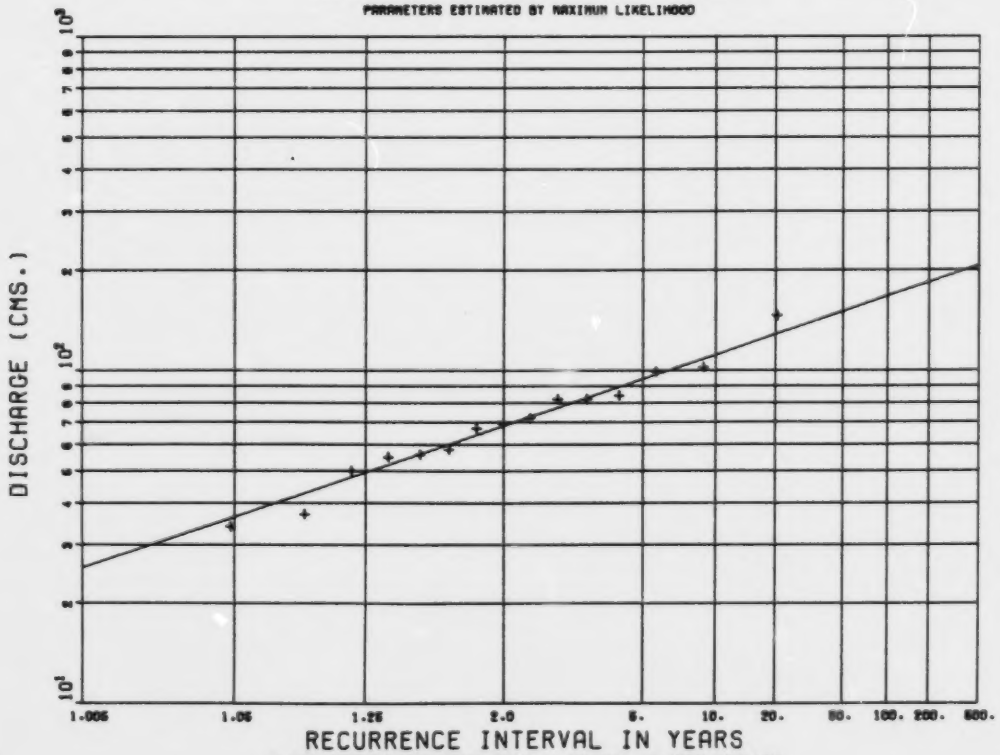
SAMPLE STATISTICS
MEAN = 73. S.D. = 28.5 C.S. = 1.0895 C.K. = 5.7132
SAMPLE STATISTICS (LOGS)
MEAN = 4.2204 S.D. = .3837 C.S. = -.0370 C.K. = 3.9289
SAMPLE MIN = 34. SAMPLE MAX = 146. N = 15

PARAMETERS FOR GUMBEL I A = .046447 U = 60.
PARAMETERS FOR LOGNORMAL M = 4.2204 S = .3837
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 4.2186 S = .3875
STATISTICS OF LOG(X-A)
MEAN = 4.2186 S.D. = .3875 C.S. = -.0470 C.K. = 3.9194
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0071 B = .2926E+04 LOG(M) =24.9751
ME= .7023E+11
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0076 B = .2364E+04
LOG(M)F=22.2452 M = .4581E+10
DISTRIBUTION STATISTICS MEAN = 4.2204 S.D. = .3707 C.S. = -.0411

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	25.		25.		26.		26.		25.	
1.050	36.		36.		36.		37.		36.	
1.250	50.		49.		49.		50.		49.	
2.000	66.		66.		66.		66.		66.	
2.330	73.	9.68	73.	9.99	73.	10.60	73.	10.30	73.	10.70
5.000	93.	10.80	94.	11.50	94.	11.60	93.	11.10	94.	11.50
10.000	109.	11.80	111.	13.40	111.	13.60	109.	12.90	111.	13.40
20.000	124.	12.60	128.	15.20	128.	16.70	125.	15.80	127.	16.30
50.000	144.	13.50	150.	17.50	150.	20.50	145.	20.50	149.	21.30
100.000	159.	14.10	166.	19.10	167.	24.10	159.	24.60	164.	25.50
200.000	174.	14.60	183.	20.60	183.	27.30	174.	28.90	180.	30.00
500.000	194.	15.10	206.	22.50	206.	31.60	194.	34.80	202.	36.20

F.E. = FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SEVERN RIVER BELOW OUTLET OF DEER LAKE 04CA004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I313.0

SEVERN RIVER BELOW WASHAGO 02EC004

DRAINAGE AREA : 3788.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1963 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	87.	26.	-.423	3.265
LN X SERIES	4.37	.37	-1.154	4.934

X(MIN)= 30. CMS. TOTAL SAMPLE SIZE= 20
X(MAX)= 122. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

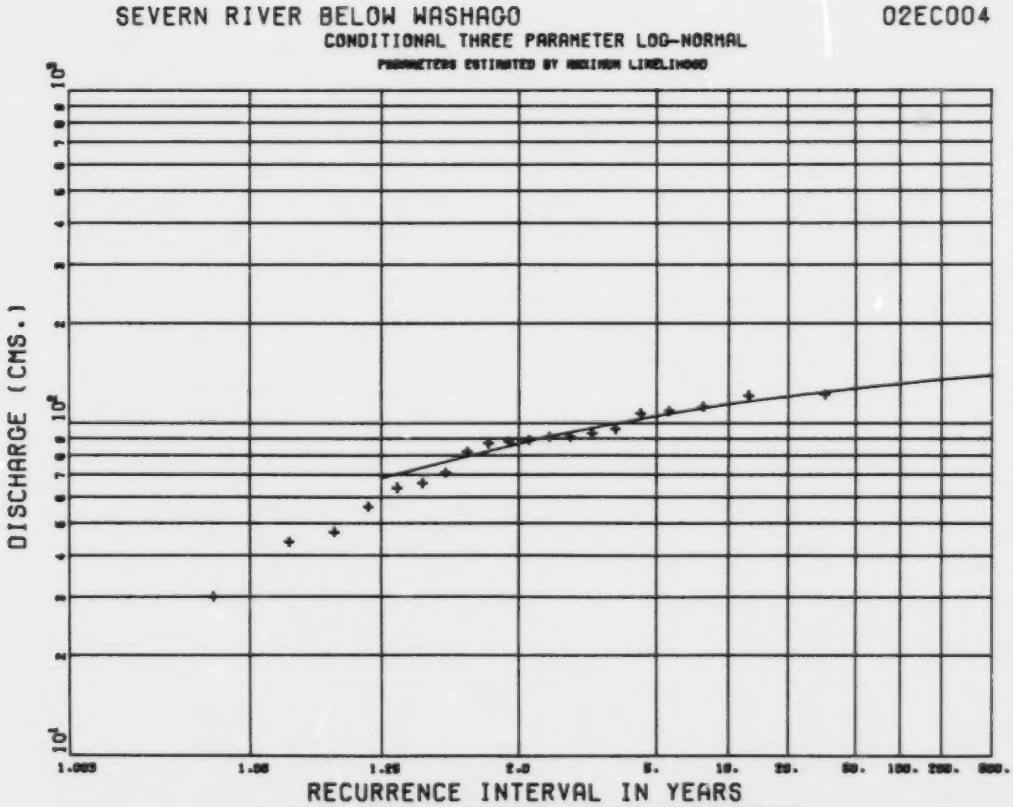
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	86.	25.	-.375	3.132
LN X SERIES	4.42	.30	-.794	3.748
LN (X-A) SERIES	4.85	.18	-.052	3.109

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 216.0764 M = 4.8522 S = .1792

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	60.
2.000	.500	87.
2.330	.429	91.
5.000	.200	105.
10.000	.100	114.
20.000	.050	120.
50.000	.020	127.
100.000	.010	131.
200.000	.005	135.
500.000	.002	139.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1314.0

SHAMATTAWA RIVER AT OUTLET OF SHAMATTAWA LAKE 04DC002

DRAINAGE AREA = 4710.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1968 - 1982

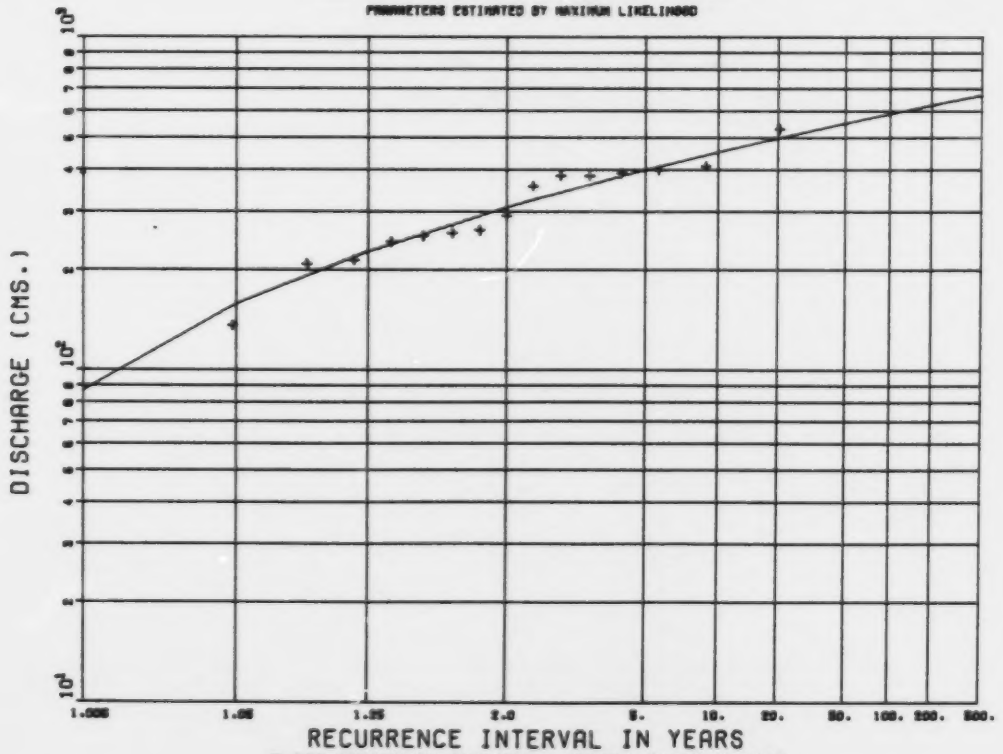
SAMPLE STATISTICS
MEAN = 315. S.D. = 103.0 C.S. = .2829 C.K. = 3.5907
SAMPLE STATISTICS (LOGS)
MEAN = 5.6976 S.D. = .3497 C.S. = -.5394 C.K. = 4.0664
SAMPLE MIN = 136. SAMPLE MAX = 530. N = 15

PARAMETERS FOR GUMBEL I A = .011233 U = 266.
PARAMETERS FOR LOGNORMAL M = 5.6976 S = .3497
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -430. M = 6.6042 S = .1383
STATISTICS OF LOG(X-A)
MEAN = 6.6042 S.D. = .1383 C.S. = -.0381 C.K. = 3.4407
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8543 B = .1375E+02 LOG(M) = 6.9942
ME= .1090E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1207 B = .8038E+01
LOG(M)F= 6.6677 M = .7866E+03
DISTRIBUTION STATISTICS MEAN = 5.6976 S.D. = .3422 C.S. = -.7054

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	118.		121.		87.		99.		101.	
1.050	167.		168.		158.		160.		160.	
1.250	224.		222.		227.		228.		225.	
2.000	299.		298.		308.		310.		306.	
2.330	316.	9.18	317.	9.10	326.	8.92	329.	8.83	327.	9.71
5.000	400.	10.40	400.	10.50	399.	8.66	400.	8.23	402.	8.98
10.000	467.	11.40	467.	12.20	451.	9.63	447.	8.29	455.	9.59
20.000	531.	12.30	530.	13.80	497.	11.20	485.	8.92	505.	11.60
50.000	614.	13.20	611.	15.90	551.	13.20	527.	10.50	551.	15.60
100.000	676.	13.70	672.	17.40	588.	15.80	554.	12.10	585.	19.10
200.000	738.	14.20	734.	18.80	624.	17.90	577.	13.90	617.	22.80
500.000	819.	14.80	816.	20.50	669.	20.70	604.	16.40	654.	27.80

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SHAMATTAWA RIVER AT OUTLET OF SHAMATTAWA LAKE 04DC002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I315.0

SHEBANDOWAN RIVER AT GLENWATER 02AB005

DRAINAGE AREA : 2560.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1933 - 1957

SAMPLE STATISTICS
MEAN = 171. S.D. = 88.9 C.S. = .9936 C.K. = 4.2514
SAMPLE STATISTICS (LOGS)
MEAN = 5.0104 S.D. = .5460 C.S. = -.4167 C.K. = 3.5606
SAMPLE MIN = 44. SAMPLE MAX = 379. N = 25

PARAMETERS FOR GUMBEL I A = .014835 U = 132.
PARAMETERS FOR LOGNORMAL M = 5.0104 S = .5460
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -46. M = 5.3060 S = .4019
STATISTICS OF LOG(X-A)
MEAN = 5.3060 S.D. = .4019 C.S. = -.0462 C.K. = 3.3437
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1138 B = .2303E+02 LOG(M) = 7.6308
ME= .2061E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1253 B = .1835E+02
LOG(M)= 7.3086 M = .1493E+04
DISTRIBUTION STATISTICS MEAN = 5.8104 S.D. = .5365 C.S. = -.4659

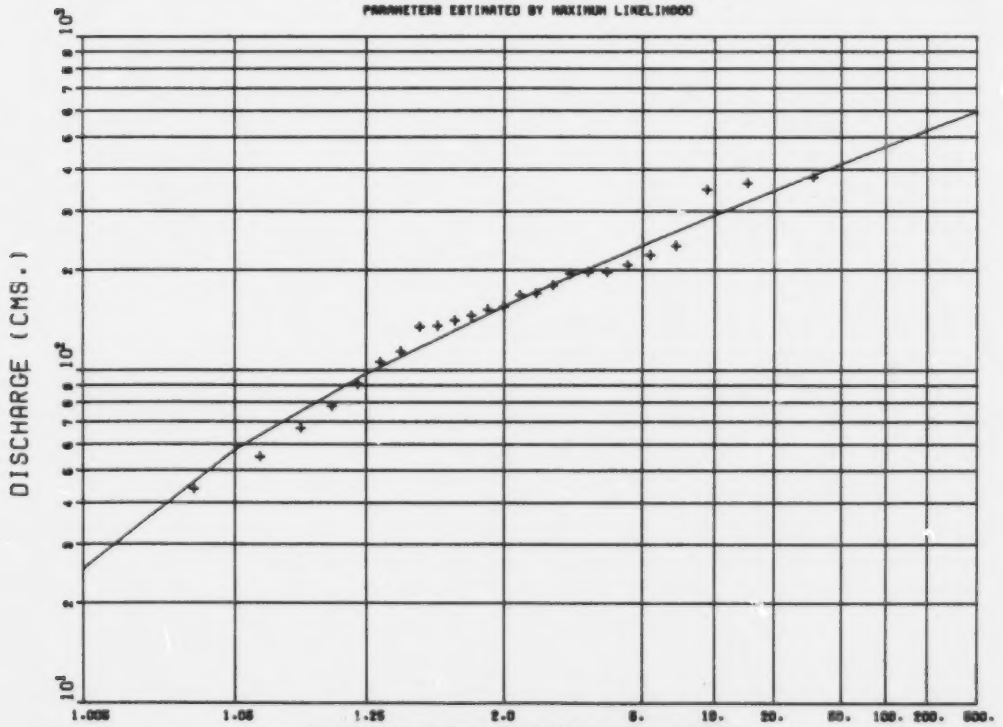
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	20.		37.		25.		30.		30.	
1.050	57.		61.		58.		58.		58.	
1.250	100.		95.		97.		97.		96.	
2.000	157.		150.		155.		156.		156.	
2.330	171.	10.00	165.	11.00	170.	10.50	172.	11.10	171.	11.70
5.000	233.	10.40	237.	12.70	236.	11.20	237.	10.90	239.	11.30
10.000	284.	11.00	302.	14.70	291.	12.90	289.	11.60	293.	12.30
20.000	332.	11.50	360.	16.80	344.	15.30	336.	13.30	344.	14.70
50.000	395.	12.00	460.	19.30	414.	18.70	393.	16.40	406.	19.40
100.000	442.	12.30	534.	21.00	467.	21.30	434.	19.30	452.	23.50
200.000	489.	12.60	612.	22.70	521.	23.90	474.	22.50	496.	27.90
500.000	551.	12.90	723.	24.80	595.	27.30	523.	26.90	552.	34.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SHEBANDOWAN RIVER AT GLENWATER 02AB005

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I316.0

SHEBANDOWAN RIVER AT SUNSHINE 02AB009

DRAINAGE AREA : 2808.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1958 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	162.	78.	.884	4.673
LN X SERIES	4.97	.53	-.776	5.239

X(MIN)= 32. CMS. TOTAL SAMPLE SIZE= 25
X(MAX)= 372. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	167.	74.	1.068	4.891
LN X SERIES	5.03	.43	-.030	3.346
LN (X-A) SERIES	4.94	.47	-.069	3.402

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 12.0819 M = 4.9385 S = .4743

FLOOD FREQUENCY REGIME

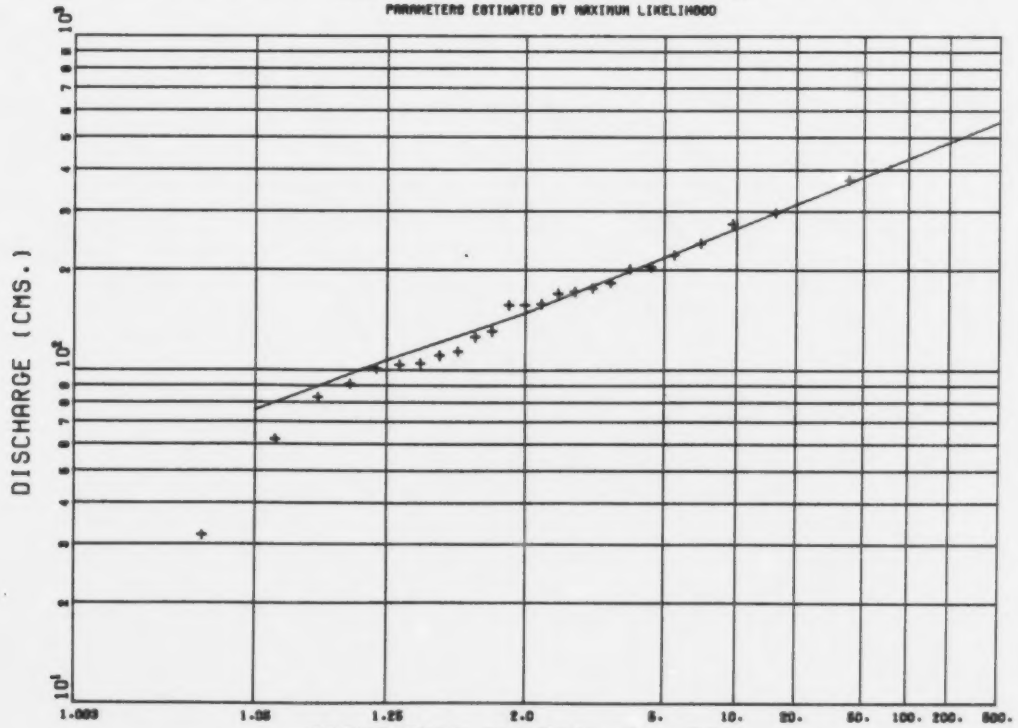
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	76.
1.250	.800	107.
2.000	.500	148.
2.330	.429	161.
5.000	.200	217.
10.000	.100	266.
20.000	.050	314.
50.000	.020	379.
100.000	.010	430.
200.000	.005	483.
500.000	.002	555.

SHEBANDOWAN RIVER AT SUNSHINE 02AB009

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I317.0

SHEKAK RIVER AT HIGHWAY NO.11 04JC003

DRAINAGE AREA = 3290.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1951 - 1982

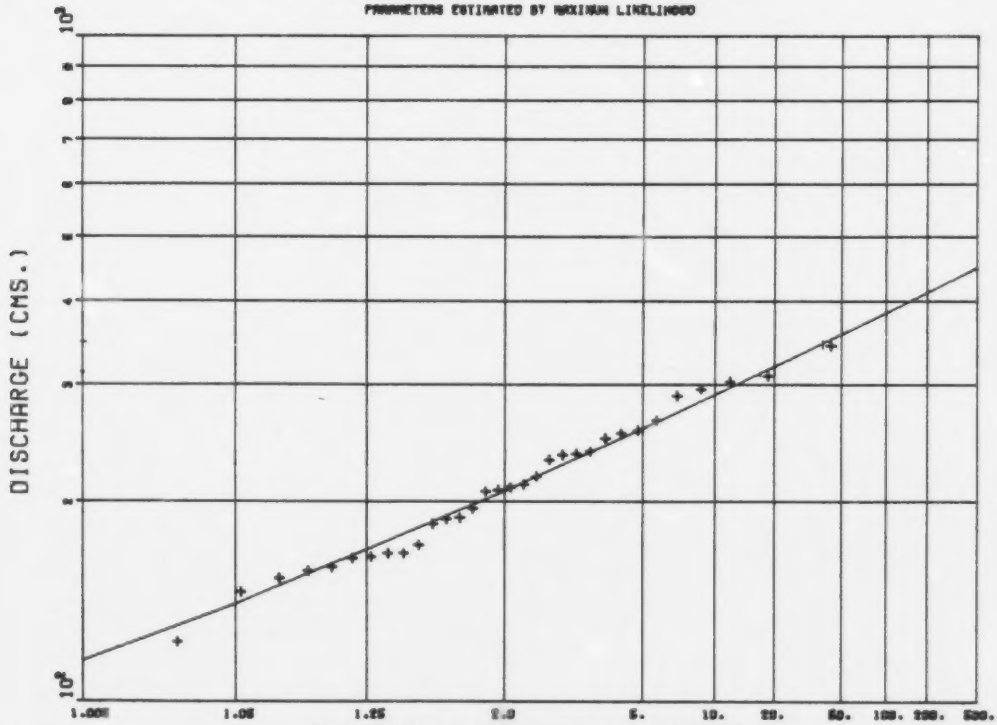
SAMPLE STATISTICS
MEAN = 215. S.D. = 54.2 C.S. = .5256 C.K. = 2.9317
SAMPLE STATISTICS (LOGS)
MEAN = 5.3412 S.D. = .2500 C.S. = .0496 C.K. = 2.6671
SAMPLE MIN = 123. SAMPLE MAX = 343. N = 32

PARAMETERS FOR GUMBEL I A = .022616 U = 190.
PARAMETERS FOR LOGNORMAL M = 5.3412 S = .2500
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 38. M = 5.1314 S = .3079
STATISTICS OF LOG(X-A)
MEAN = 5.1314 S.D. = .3079 C.S. = -.0688 C.K. = 2.7405
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0062 B = .1629E+04 LOG(M) = -4.7501
ME= .8651E-02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0125 B = .3857E+03
LOG(M)F= .5059 M = .1658E+01
DISTRIBUTION STATISTICS MEAN = 5.3412 S.D. = .2462 C.S. = .1018

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	116.		110.		115.		113.		111.	
1.050	141.		138.		140.		140.		139.	
1.250	169.		169.		169.		169.		169.	
2.000	206.		209.		207.		208.		208.	
2.330	216.	4.60	218.	4.45	217.	4.80	217.	4.73	218.	4.80
5.000	256.	5.50	258.	5.14	257.	5.40	257.	5.23	258.	5.24
10.000	289.	6.24	288.	5.97	289.	6.55	287.	6.26	288.	6.21
20.000	321.	6.88	315.	6.78	319.	8.05	315.	7.75	316.	7.65
50.000	362.	7.59	349.	7.79	357.	10.30	351.	10.20	351.	10.00
100.000	393.	8.03	373.	8.51	384.	12.10	377.	12.20	377.	12.00
200.000	424.	8.42	398.	9.18	412.	13.90	403.	14.40	402.	14.20
500.000	465.	8.87	429.	10.00	449.	16.30	437.	17.40	435.	17.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SHEKAK RIVER AT HIGHWAY NO.11 04JC003
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I318.0

SHELTER VALLEY BROOK NEAR GRAFTON 02HD010

DRAINAGE AREA = 64.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

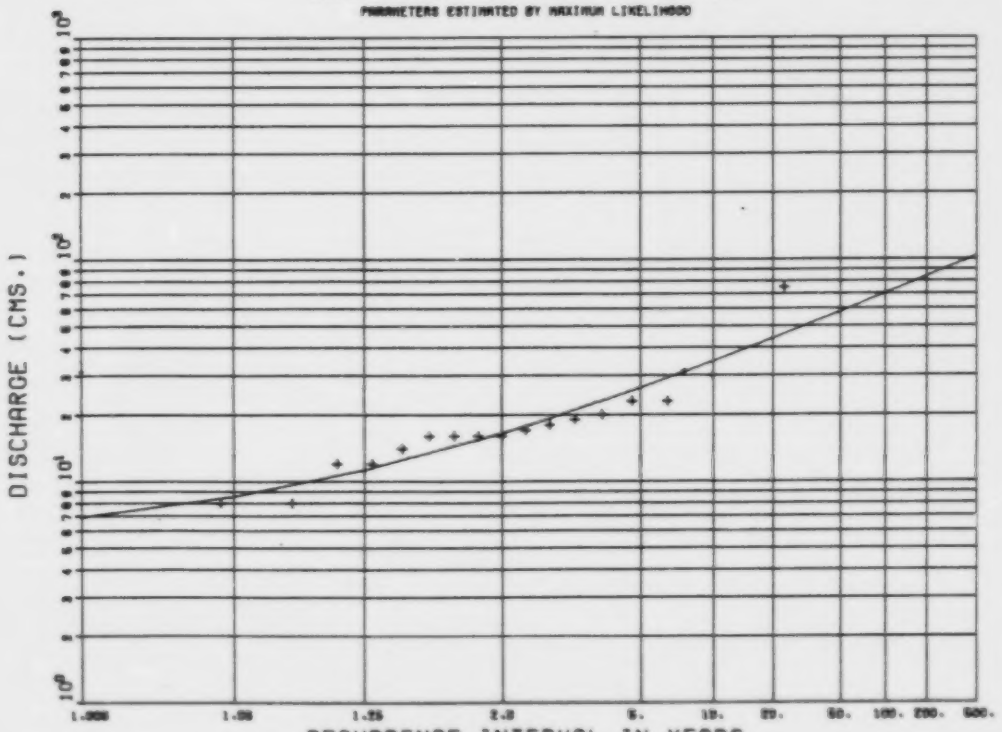
SAMPLE STATISTICS
MEAN = 20. S.D. = 15.2 C.S. = 3.2692 C.K. = 15.7287
SAMPLE STATISTICS (LOGS)
MEAN = 2.8536 S.D. = .5108 C.S. = 1.2273 C.K. = 7.2941
SAMPLE MIN = 8. SAMPLE MAX = 75. N = 17

PARAMETERS FOR GUMBEL I A = .142754 U = 15.
PARAMETERS FOR LOGNORMAL M = 2.8536 S = .5108
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 2.4107 S = .7550
STATISTICS OF LOG(X-A)
MEAN = 2.4107 S.D. = .7550 C.S. = .1697 C.K. = 5.5615
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .3135 B = .2656E+01 LOG(M) = 2.0212
ME= .7547E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1686 B = .8295E+01
LOG(M)= 1.4549 M = .4284E+01
DISTRIBUTION STATISTICS MEAN = 2.8536 S.D. = .485E C.S. = .6944

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	4.		5.		7.		7.		8.	
1.050	7.		7.		9.		9.		9.	
1.250	12.		11.		11.		12.		11.	
2.000	18.		17.		16.		16.		16.	
5.000	26.	11.20	27.	14.40	26.	17.00	26.	16.10	25.	19.20
10.000	31.	12.70	33.	16.70	35.	21.50	33.	21.00	34.	25.90
20.000	36.	13.30	40.	19.80	44.	26.40	42.	26.90	46.	37.00
50.000	43.	14.00	50.	21.80	58.	32.60	56.	35.80	67.	56.40
100.000	48.	14.50	57.	23.80	70.	37.60	68.	43.00	88.	73.30
200.000	52.	14.80	65.	25.70	83.	42.20	83.	50.60	115.	91.70
500.000	59.	15.20	76.	28.10	103.	48.00	107.	61.10	165.	118.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SHELTER VALLEY BROOK NEAR GRAFTON 02HD010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I319.0

SHIPKA CREEK NEAR GRAND BEND 02FF006

DRAINAGE AREA = 23.7 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1957 - 1969

SAMPLE STATISTICS
MEAN = 13. S.D. = 8.7 C.S. = .5293 C.K. = 2.7346
SAMPLE STATISTICS (LOGS)
MEAN = 2.3115 S.D. = .7935 C.S. = -.4728 C.K. = 3.5376
SAMPLE MIN = 2. SAMPLE MAX = 28. N = 13

PARAMETERS FOR GUMBEL I A = .152272 U = 9.
PARAMETERS FOR LOGNORMAL M = 2.3115 S = .7935
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 2.4745 S = .6707
STATISTICS OF LOG(X-A)
MEAN = 2.4745 S.D. = .6707 C.S. = -.2461 C.K. = 3.0458
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1873 B = .1795E+02 LOG(M) = 5.6736
ME= .2911E+03

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

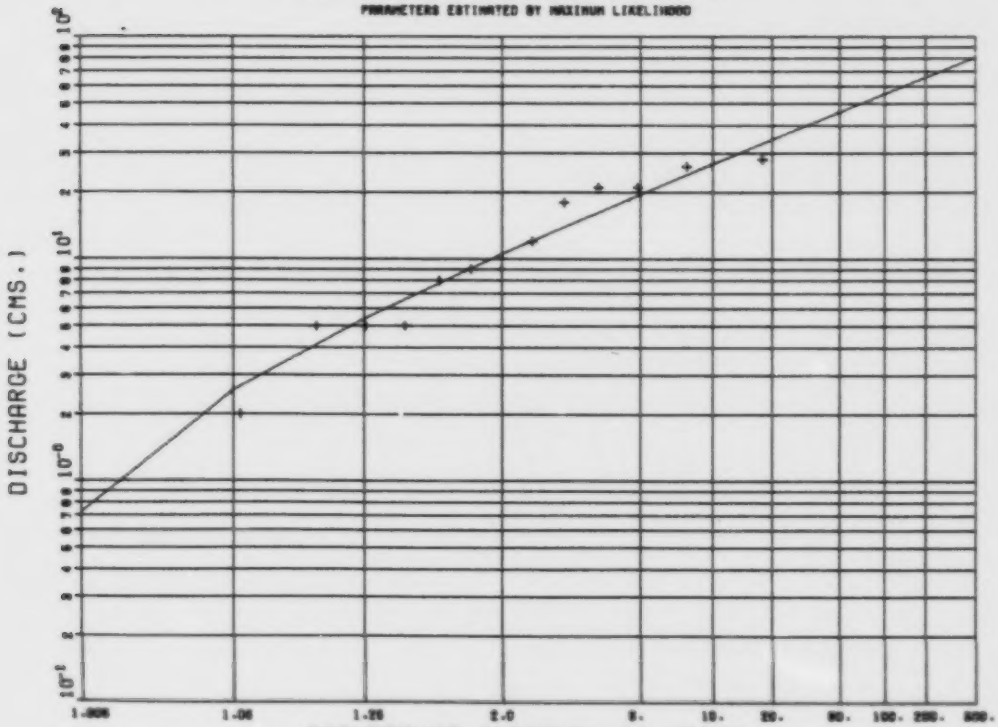
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-2.		1.		1.		0.		1.	
1.01	1.		1.		1.		0.		2.	
1.05	4.		3.		3.		0.		2.	
1.11	6.		5.		5.		0.		5.	
1.25	11.		10.		11.		0.		11.	
2.0	13.	18.09	12.	22.20	12.	21.78	0.	0.00	12.	23.68
5.0	19.	17.40	20.	25.60	20.	23.25	0.	0.00	20.	22.44
10.	24.	17.70	28.	28.70	27.	27.20	0.	0.00	27.	24.71
20.	29.	18.00	37.	33.80	34.	31.90	0.	0.00	33.	29.08
25.	35.	18.50	42.	38.80	46.	38.40	0.	0.00	42.	36.58
50.	39.	18.80	84.	42.40	55.	43.20	0.	0.00	47.	40.80
100.	44.	19.00	98.	45.70	65.	47.80	0.	0.00	55.	55.80
200.	50.	19.30	99.	49.90	81.	53.60	0.	0.00	64.	68.03

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SHIPKA CREEK NEAR GRAND BEND 02FF006

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1320.0

SKOOTAMATTA RIVER NEAR ACTINOLITE 02HL004

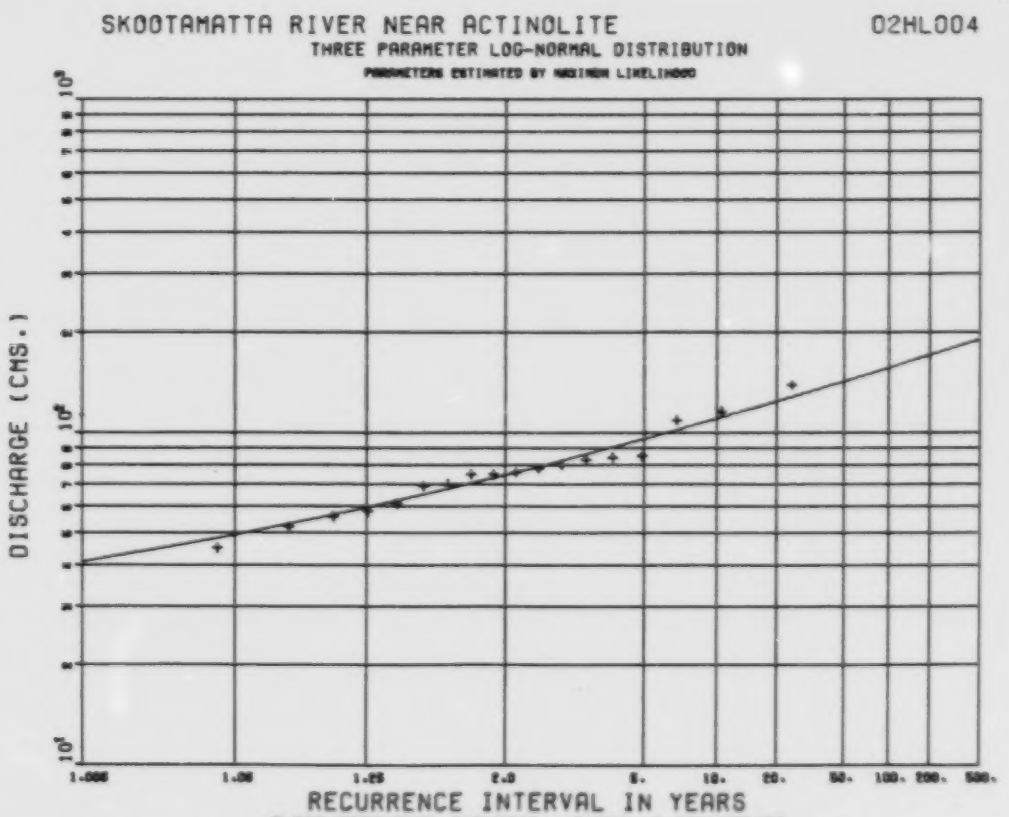
DRAINAGE AREA = 712.6 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1965 - 1982

SAMPLE STATISTICS
MEAN = 78. S.D. = 23.4 C.S. = 1.1458 C.K. = 5.1723
SAMPLE STATISTICS (LOGS)
MEAN = 4.3238 S.D. = .2824 C.S. = .3483 C.K. = 3.9274
SAMPLE MIN = 45. SAMPLE MAX = 139. N = 18

PARAMETERS FOR GUMBEL I A = .057709 U = 68.
PARAMETERS FOR LOGNORMAL M = 4.3238 S = .2824
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 23. M = 3.9372 S = .4116
STATISTICS OF LOG(X-A)
MEAN = 3.9372 S.D. = .4110 C.S. = -.8228 C.K. = 3.8633
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8492 B = .3298E+02 LOG(M) = 2.7814
ME= .1498E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .8504 B = .2972E+02
LOG(P)F= 2.8246 M = .1685E+02
DISTRIBUTION STATISTICS MEAN = 4.3238 S.D. = .2746 C.S. = .3669

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	39.		36.		41.		41.		43.	
1.050	49.		47.		49.		50.		49.	
1.250	60.		60.		59.		60.		59.	
2.000	75.		75.		74.		74.		74.	
2.330	78.	6.62	79.	6.71	78.	7.28	78.	7.84	78.	7.37
5.000	94.	7.81	96.	7.75	95.	8.57	94.	8.28	95.	8.49
10.000	107.	8.81	108.	9.98	110.	10.60	108.	10.30	109.	10.60
20.000	120.	9.65	120.	10.20	124.	13.20	122.	13.10	123.	13.60
50.000	136.	10.60	135.	11.70	142.	17.00	140.	17.30	142.	18.30
100.000	148.	11.20	145.	12.80	156.	19.90	154.	20.80	156.	22.30
200.000	160.	11.70	156.	13.80	171.	22.80	168.	24.60	171.	26.50
500.000	176.	12.20	170.	15.10	190.	26.70	188.	29.70	192.	32.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I331.0

SOPER CREEK AT BOWMANVILLE 02HD007

DRAINAGE AREA = 77.7 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1960 - 1982

SAMPLE STATISTICS
MEAN = 33. S.D. = 38.0 C.S. = 3.3220 C.K. = 16.7142
SAMPLE STATISTICS (LOGS)
MEAN = 3.2474 S.D. = .6729 C.S. = .3942 C.K. = 5.3168
SAMPLE MIN = 6. SAMPLE MAX = 155. N = 23

PARAMETERS FOR GUMBEL I A = .869644 U = 23.
PARAMETERS FOR LOGNORMAL M = 3.2474 S = .6729
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 3.1710 S = .7245
STATISTICS OF LOG(X-A)
MEAN = 3.1710 S.D. = .7245 C.S. = .1846 C.K. = 4.3632
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1326 B = .2574E+02 LOG(M) = -.1665
ME= .8466E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0767 B = .7468E+02
LOG(M)F=-2.4254 M = .8844E-01
DISTRIBUTION STATISTICS MEAN = 3.2474 S.D. = .6564 C.S. = .2314

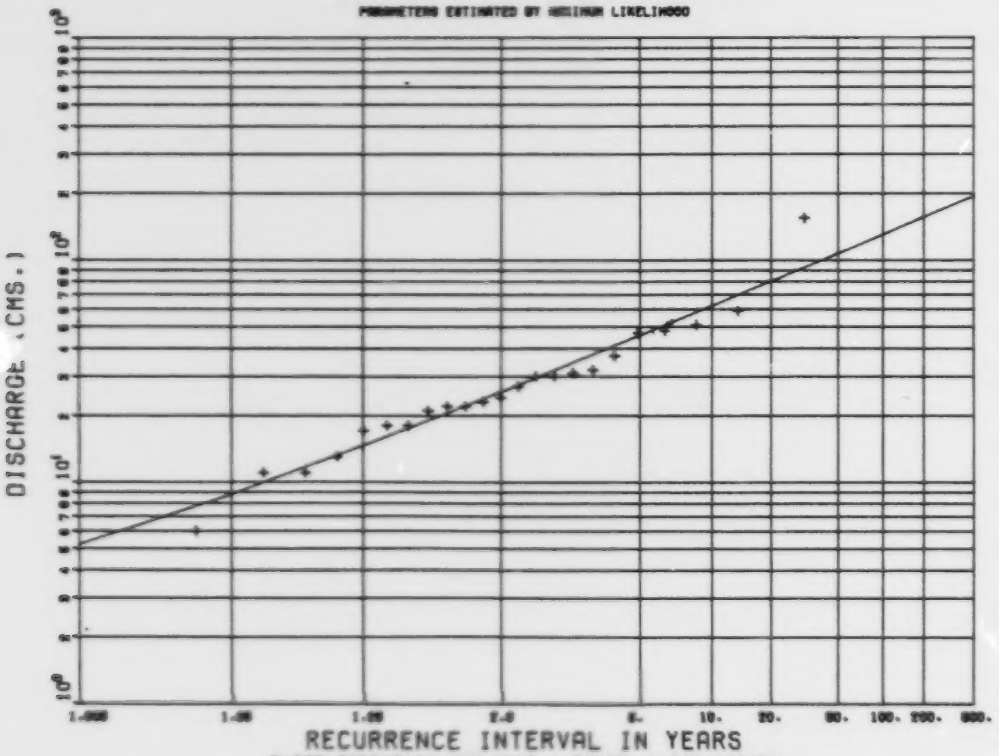
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-2.		5.		5.		5.		6.	
1.053	7.		9.		9.		9.		9.	
1.250	16.		15.		15.		15.		15.	
2.000	28.		25.		25.		25.		25.	
5.000	51.	12.40	49.	14.10	49.	14.90	48.	14.90	48.	15.50
10.000	66.	12.30	63.	16.30	65.	17.00	64.	17.20	65.	18.10
20.000	81.	12.60	76.	18.90	82.	20.40	81.	20.80	82.	22.70
50.000	96.	13.00	91.	21.50	100.	24.30	99.	26.20	103.	29.30
100.000	107.	13.40	102.	23.70	113.	27.60	113.	30.30	118.	33.70
200.000	118.	13.90	113.	25.90	127.	31.00	127.	34.30	134.	38.50
500.000	132.	14.50	127.	28.80	146.	35.40	146.	39.60	155.	44.50
1000.000	143.	14.90	138.	31.00	161.	38.40	161.	43.60	172.	49.50
2000.000	155.	15.30	149.	33.20	177.	41.50	177.	48.00	191.	54.80
5000.000	171.	15.80	165.	36.10	200.	46.00	200.	54.30	219.	63.00
10000.000	183.	16.10	178.	38.30	220.	49.80	220.	59.50	242.	69.80
20000.000	196.	16.40	191.	40.50	240.	53.70	240.	64.80	265.	76.80
50000.000	213.	16.80	208.	43.30	268.	59.20	268.	72.20	297.	86.50
100000.000	226.	17.10	222.	45.40	291.	63.80	291.	78.20	324.	94.30
200000.000	239.	17.40	236.	47.50	315.	68.60	315.	84.40	352.	102.00
500000.000	257.	17.80	256.	50.20	348.	75.00	348.	92.90	393.	113.00
1000000.000	271.	18.10	272.	52.30	376.	80.30	376.	99.80	427.	122.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SOPER CREEK AT BOWMANVILLE 02HD007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I322.0

SOPER CK. NEAR STEPHENS GULCH 02HD223

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. ARE NOT AFFECTED)

DRAINAGE AREA 17.4 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1966 - 1977

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	719.	459.	1.558	7.523
LN X SERIES	6.40	.66	-.733	7.849

X(MIN)= 195.CMS.(*100) TOTAL SAMPLE SIZE= 12
X(MAX)= 1815.CMS.(*100) NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	773.	440.	1.835	8.107
LN X SERIES	6.54	.46	1.247	6.151
LN (X-A) SERIES	5.53	1.05	-.108	5.617

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 367.7770 M = 5.5331 S = 1.0457

FLOOD FREQUENCY REGIME

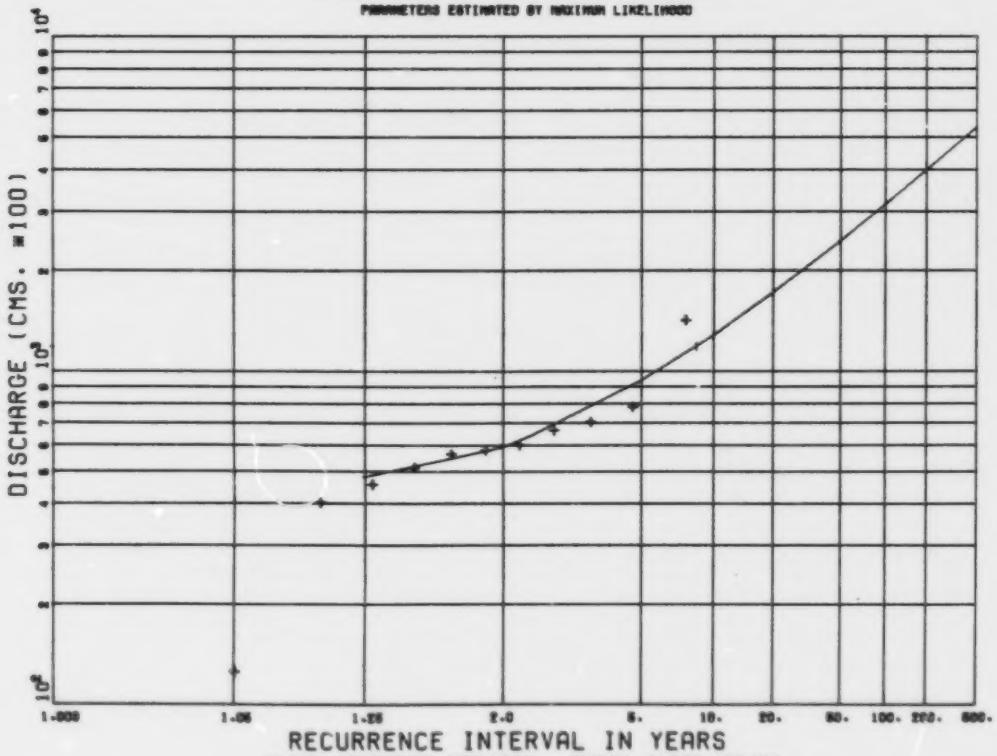
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.(*100)
1.003	.997	-
1.050	.952	-
1.250	.800	480.
2.000	.500	592.
2.330	.429	643.
5.000	.200	930.
10.000	.100	1280.
20.000	.050	1720.
50.000	.020	2450.
100.000	.010	3150.
200.000	.005	3990.
500.000	.002	5350.

SOPER CK. NEAR STEPHENS GULCH 02HD223

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : 1323.0

SOPER CREEK NEAR TYRONE 02HD221

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 1.0
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 4.9 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1977

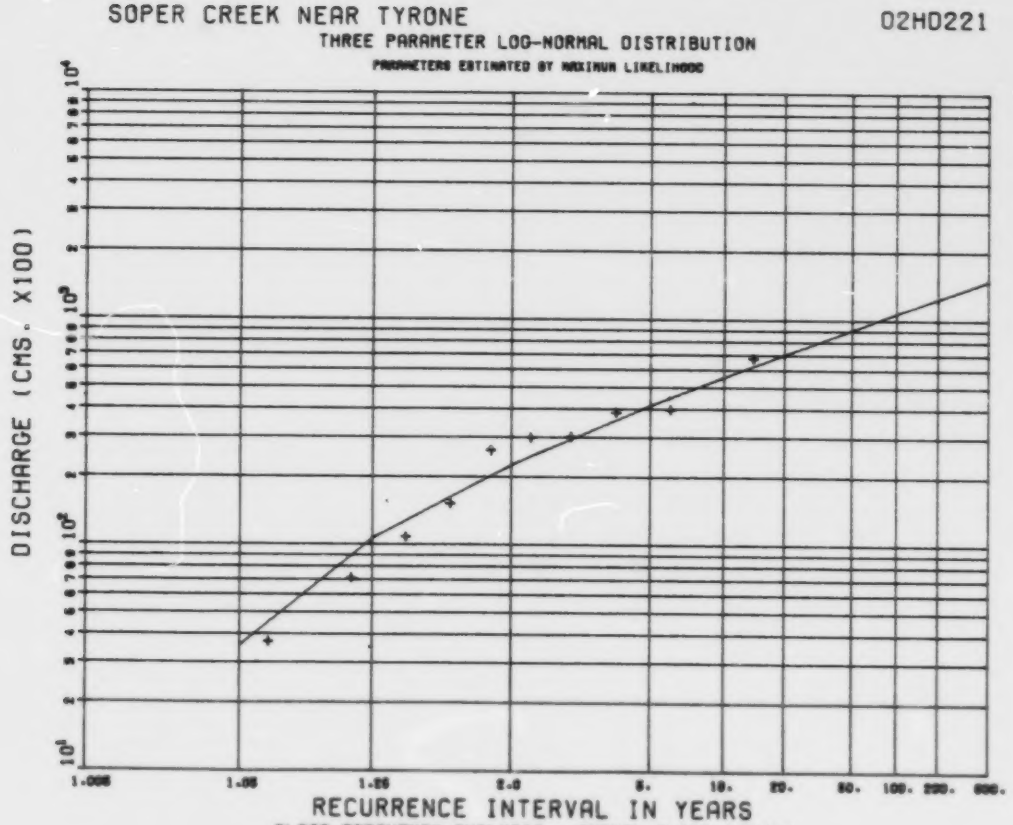
SAMPLE STATISTICS
MEAN = 269. S.D. = 191.2 C.S. = .8805 C.K. = 5.3367
SAMPLE STATISTICS (LOGS)
MEAN = 5.3014 S.D. = .8920 C.S. = -.7199 C.K. = 4.1723
SAMPLE MIN = 37. SAMPLE MAX = 674. N = 10

PARAMETERS FOR GUMBEL I A = .007019 U = 185.
PARAMETERS FOR LOGNORMAL M = 5.3014 S = .8920
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -87. N = 5.7393 S = .5648
STATISTICS OF LOG(X-A)
MEAN = 5.7393 S.D. = .5648 C.S. = -.2267 C.K. = 3.6175
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.3211 B = .7719E+01 LOG(M) = 7.7796
ME= .2391E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-53.		20.		-15.		0.		1.	
1.050	26.		66.		36.		0.		40.	
1.250	117.		95.		106.		0.		100.	
2.000	237.		201.		224.		0.		223.	
2.330	267.	21.40	239.	28.40	256.	25.20	0.	0.00	259.	30.50
5.000	399.	20.40	425.	32.80	413.	25.50	0.	0.00	432.	26.30
10.000	506.	20.60	630.	38.10	554.	28.70	0.	0.00	574.	27.60
20.000	608.	21.00	870.	43.30	700.	33.30	0.	0.00	713.	34.50
50.000	741.	21.40	1250.	49.70	904.	39.90	0.	0.00	973.	48.40
100.000	840.	21.70	1600.	54.30	1070.	44.80	0.	0.00	1390.	60.30
200.000	939.	21.90	2000.	58.60	1240.	49.60	0.	0.00	1110.	72.50
500.000	1070.	22.20	2620.	64.00	1490.	55.80	0.	0.00	1250.	88.80

F.E.= FLOOD ESTIMATE (CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1324.0

SOPER CK. TRIB. NEAR BOWMANVILLE 02HD224

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. ARE NOT AFFECTED)

DRAINAGE AREA 14.6 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1968 - 1977

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1414.	751.	.921	6.113
LN X SERIES	7.12	.49	-.656	8.054

X(MIN)= 334.CMS.(*100) TOTAL SAMPLE SIZE= 10
X(MAX)= 2828.CMS.(*100) NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1534.	688.	1.331	6.371
LN X SERIES	7.26	.43	.957	5.613
LN (X-A) SERIES	6.06	1.10	-.303	5.967

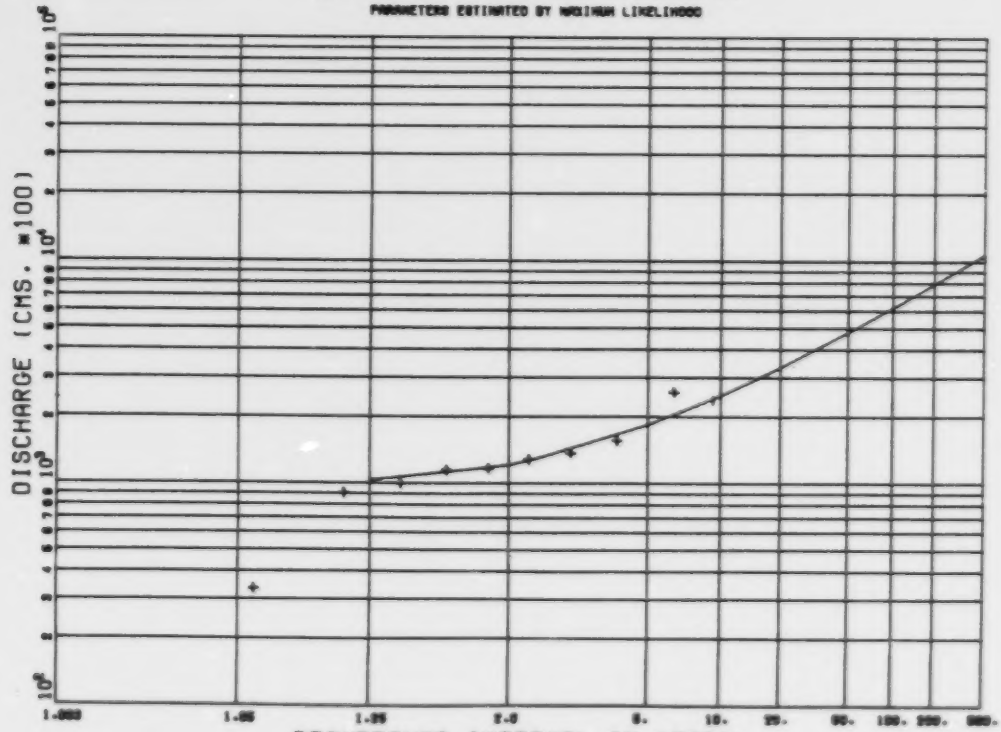
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 843.7186 M = 6.0633 S = 1.1024

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.(*100)
1.003	.997	-
1.050	.952	-
1.250	.800	1030.
2.000	.500	1210.
2.330	.429	1300.
5.000	.200	1840.
10.000	.100	2490.
20.000	.050	3330.
50.000	.020	4790.
100.000	.010	6193.
200.000	.005	7910.
500.000	.002	10700.

SOPER CK. TRIB. NEAR BOWMANVILLE 02HD224
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I325.0

SOUTH BRANCH MUSKOKA RIVER AT BAYSVILLE 02EB008

DRAINAGE AREA : 1398.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1942 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	83.	24.	-.345	3.199
LN X SERIES	4.37	.34	-1.326	5.803

X(MIN)= 26. CMS. TOTAL SAMPLE SIZE= 41
X(MAX)= 128. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	84.	22.	-.056	3.237
LN X SERIES	4.39	.29	-.945	4.741
LN (X-A) SERIES	6.93	.02	-.012	3.212

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1111.1406 M = 6.9342 S = .0216

FLOOD FREQUENCY REGIME

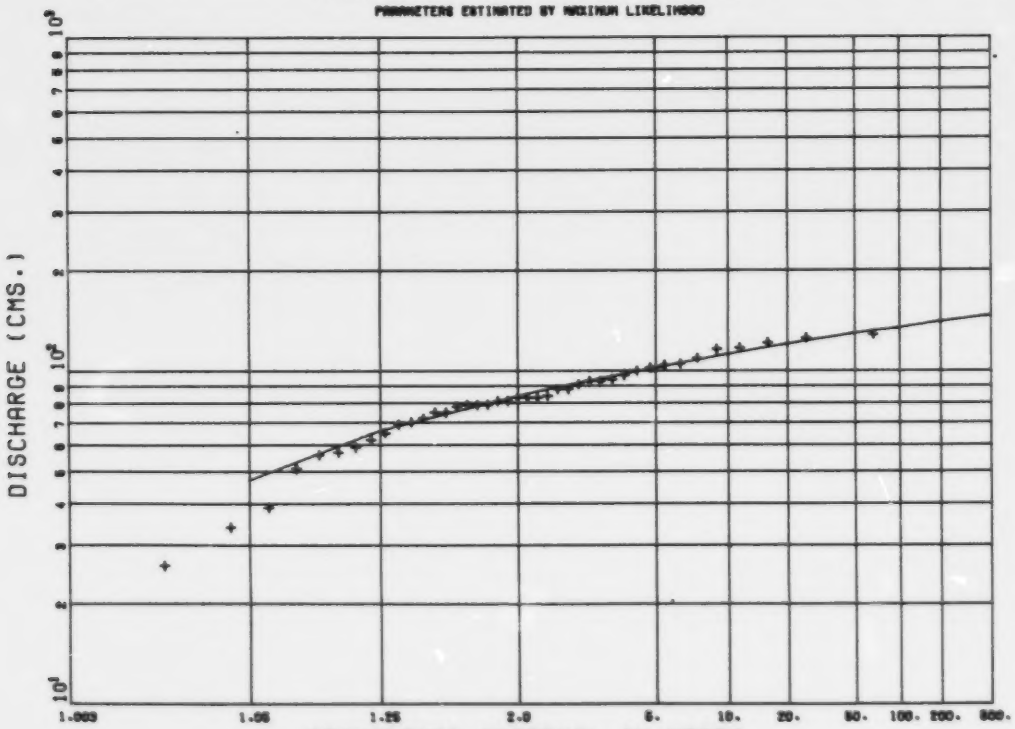
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	47.
1.250	.800	66.
2.000	.500	84.
3.330	.429	88.
5.000	.200	102.
10.000	.100	112.
20.000	.050	120.
50.000	.020	129.
100.000	.010	134.
200.000	.005	140.
500.000	.002	146.

SOUTH BRANCH MUSKOKA RIVER AT BAYSVILLE 02EB008

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE . I326.0

SOUTH BRANCH MUSKOKA RIVER AT BLACK BRIDGE 02EB002

DRAINAGE AREA 1730.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD: 1915 - 1929

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	101.	34.	-.674	5.259
LN X SERIES	4.53	.49	-2.312	11.806

X(MIN)= 20. CMS. TOTAL SAMPLE SIZE= 15
X(MAX)= 155. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	107.	27.	.170	3.531
LN X SERIES	4.64	.26	-.313	3.765
LN (X-A) SERIES	5.46	.11	-.036	3.546

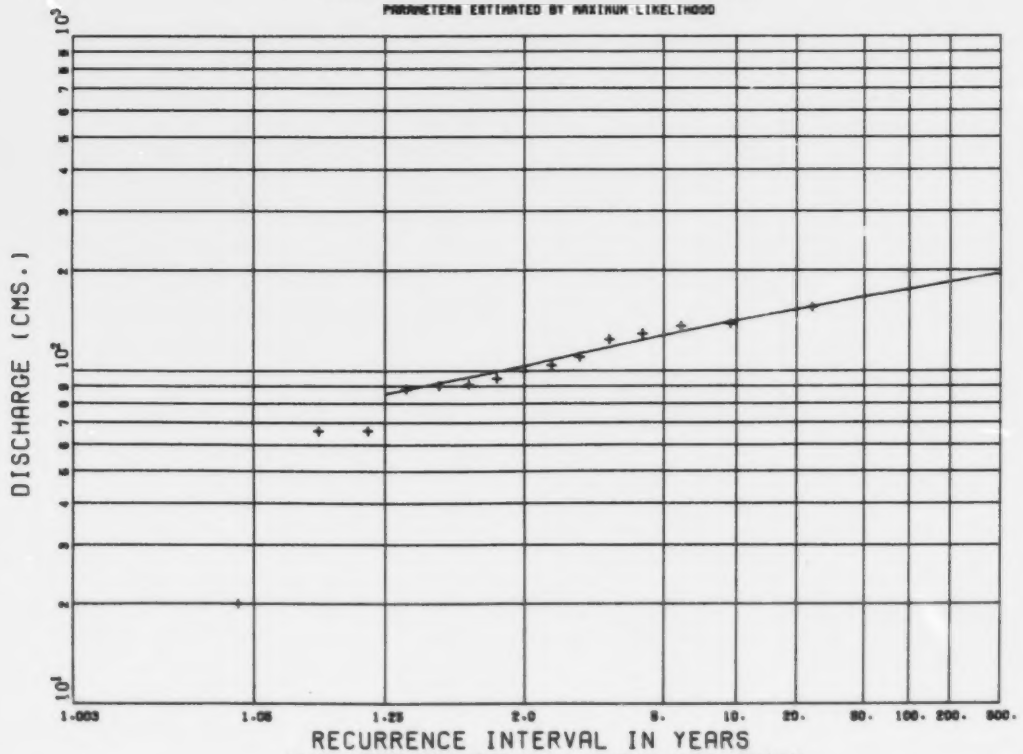
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -130.1260 M = 5.4608 S = .1135

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	85.
2.000	.500	103.
2.330	.429	110.
5.000	.200	127.
10.000	.100	141.
20.000	.050	152.
50.000	.020	166.
100.000	.010	175.
200.000	.005	184.
500.000	.002	195.

SOUTH BRANCH MUSKOKA RIVER AT BLACK BRIDGE 02EB002
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I327.0

SOUTH BRANCH MUSKOKA RIVER AT MATHIAS 02EB003

DRAINAGE AREA : 1710.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1932 - 1948

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	86.	20.	-.517	5.443
LN X SERIES	4.44	.27	-1.629	8.933

X(MIN)= 38. CMS.
X(MAX)= 125. CMS.
TOTAL SAMPLE SIZE= 17
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

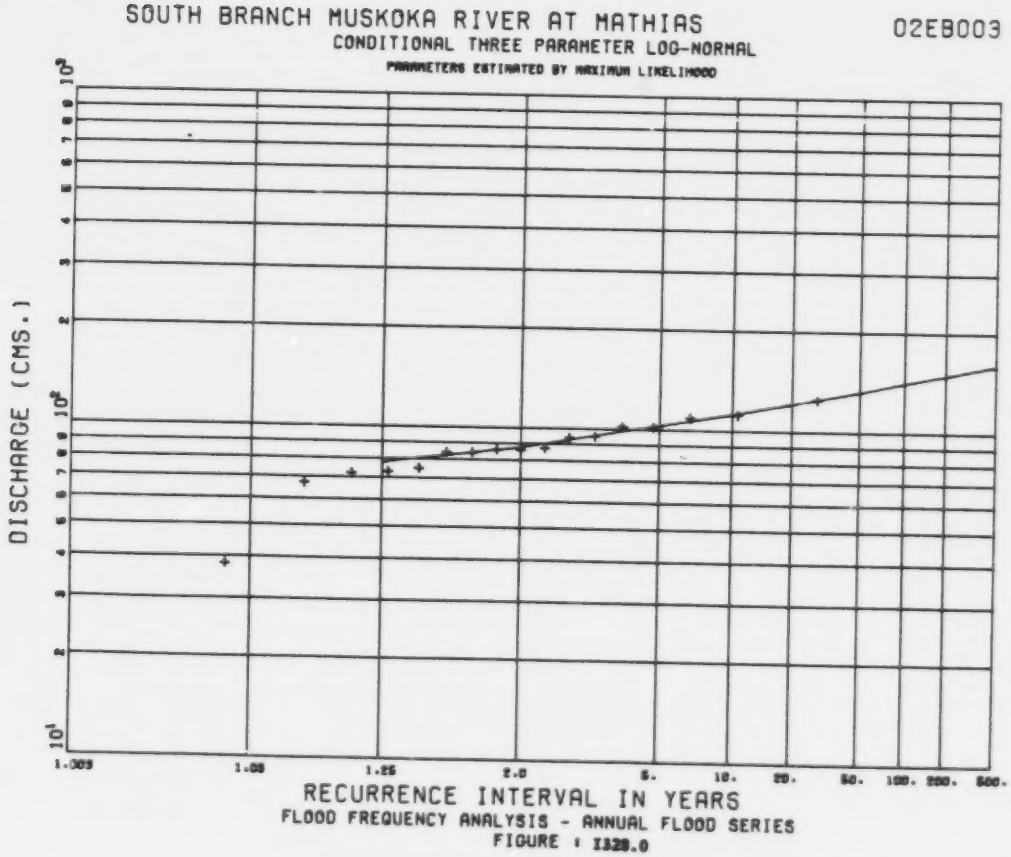
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	91.	16.	.510	3.640
LN X SERIES	4.49	.17	.125	3.447
LN (X-A) SERIES	3.92	.31	-.890	3.410

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 38.2355 M = 3.9183 S = .3086

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	70.
2.000	.500	87.
2.330	.429	90.
5.000	.200	103.
10.000	.100	112.
20.000	.050	121.
50.000	.020	132.
100.000	.010	141.
200.000	.005	149.
500.000	.002	160.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I328.0

SOUTH MAITLAND RIVER AT SUMMERHILL 02FE009

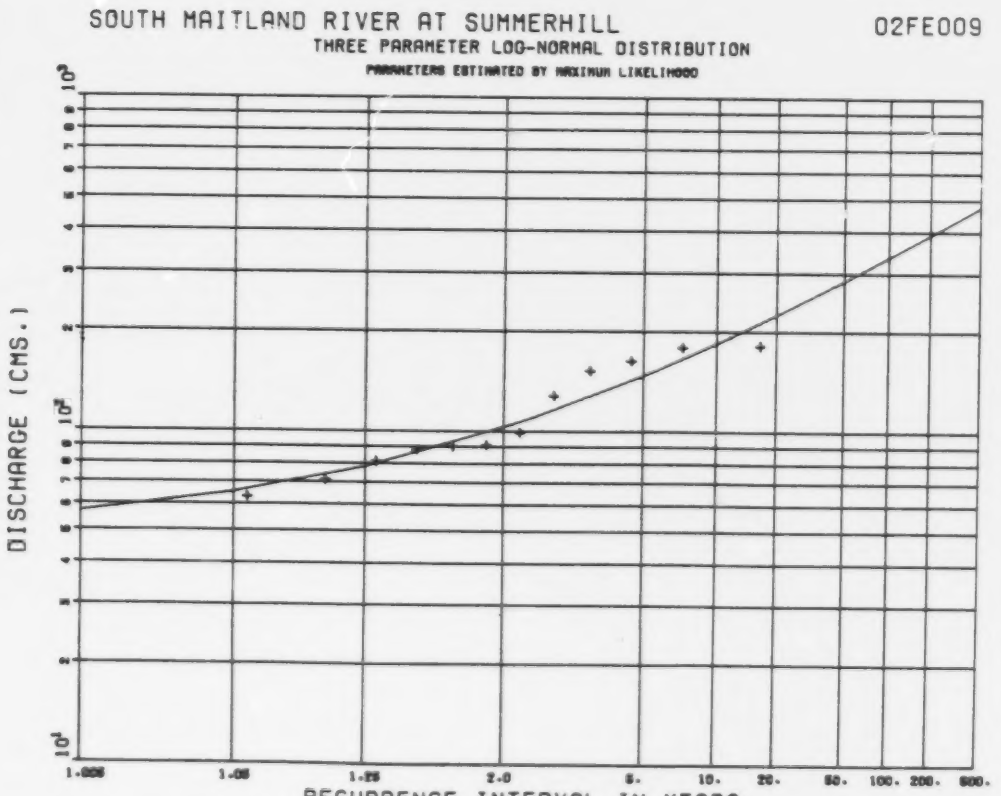
DRAINAGE AREA = 376.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1971 - 1982

SAMPLE STATISTICS
MEAN = 116. S.D. = 42.9 C.S. = .5824 C.K. = 2.5942
SAMPLE STATISTICS (LOGS)
MEAN = 4.6866 S.D. = .3698 C.S. = .1882 C.K. = 2.5803
SAMPLE MIN = 63. SAMPLE MAX = 181. N = 12

PARAMETERS FOR GUMBEL I A = .031237 U = 96.
PARAMETERS FOR LOGNORMAL M = 4.6866 S = .3698
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 48. M = 3.9961 S = .7143
STATISTICS OF LOG(X-A)
MEAN = 3.9961 S.D. = .7143 C.S. = -.2689 C.K. = 3.1656
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0247 B = .1129E+03 LOG(M) = .7651
ME= .2149E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1953 B = .3779E+01
LOG(M)= 3.9485 M = .5186E+02
DISTRIBUTION STATISTICS MEAN = 4.6866 S.D. = .3797 C.S. = 1.0289

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	43.		42.		57.		50.		45.	
1.050	61.		59.		65.		66.		60.	
1.250	81.		80.		78.		79.		79.	
2.000	108.		108.		103.		102.		107.	
2.330	115.	10.20	116.	10.70	110.	12.10	109.	11.40	115.	11.70
5.000	144.	11.60	148.	12.40	147.	16.20	144.	15.90	147.	13.10
10.000	168.	12.70	174.	14.40	184.	21.10	180.	21.30	175.	15.90
20.000	191.	13.70	199.	16.30	224.	26.60	221.	27.66	203.	19.90
50.000	221.	14.70	231.	18.60	280.	34.00	286.	36.60	240.	26.40
100.000	243.	15.30	256.	20.50	335.	39.60	345.	43.80	269.	31.90
200.000	266.	15.90	281.	22.10	391.	45.00	415.	51.40	300.	37.70
500.000	295.	16.50	314.	24.20	474.	51.90	527.	61.80	342.	45.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I329.0

SOUTH NATION RIVER AT CHESTERVILLE - 02LB009

DRAINAGE AREA : 1050.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1955 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	193.	64.	-.267	2.657
LN X SERIES	5.23	.37	-.988	4.353

X(MIN)= 65. CMS. TOTAL SAMPLE SIZE= 28
X(MAX)= 302. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

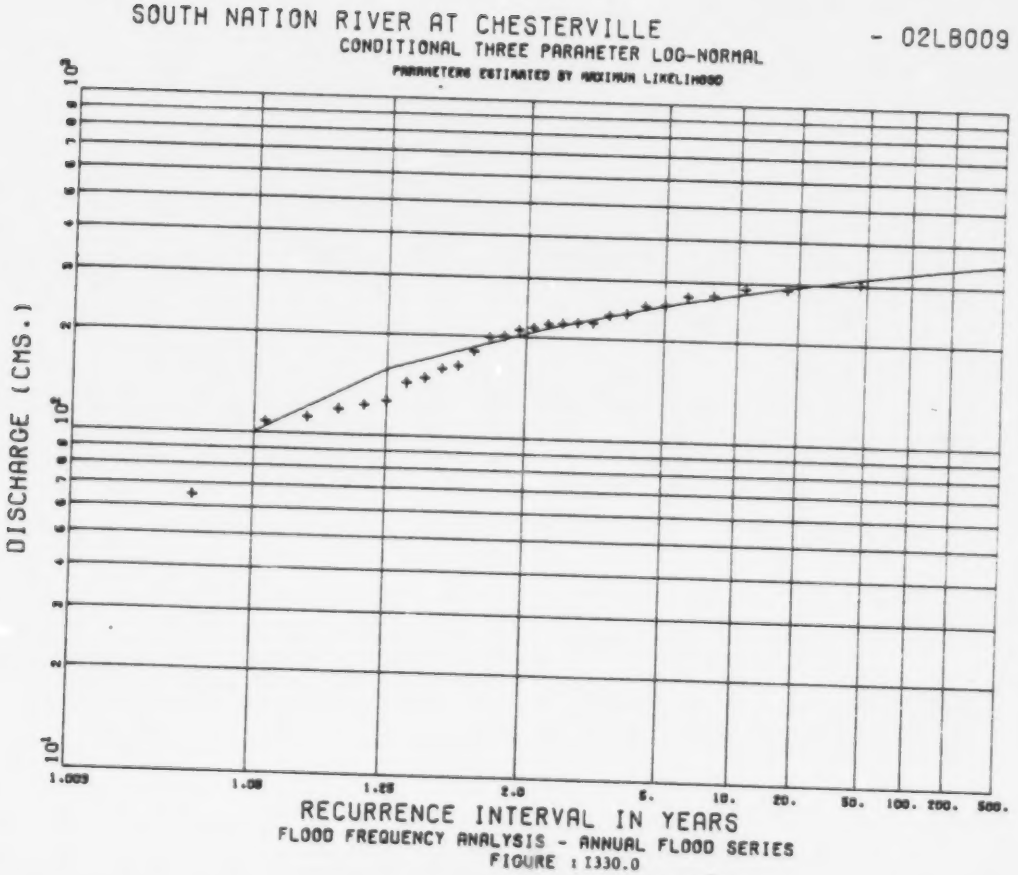
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	204.	59.	-.122	2.404
LN X SERIES	5.27	.31	-.520	2.586
LN (X-A) SERIES	6.22	.12	-.143	2.456

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 708.2773 Y = 6.2188 S = .1174

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	120.
1.250	.800	167.
2.000	.500	204.
2.330	.429	215.
5.000	.200	253.
10.000	.100	276.
20.000	.050	294.
50.000	.020	314.
100.000	.010	326.
200.000	.005	337.
500.000	.002	350.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I330.0

SOUTH NATION RIVER AT SPENCERVILLE 02LB007

DRAINAGE AREA : 246.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1948 - 1982

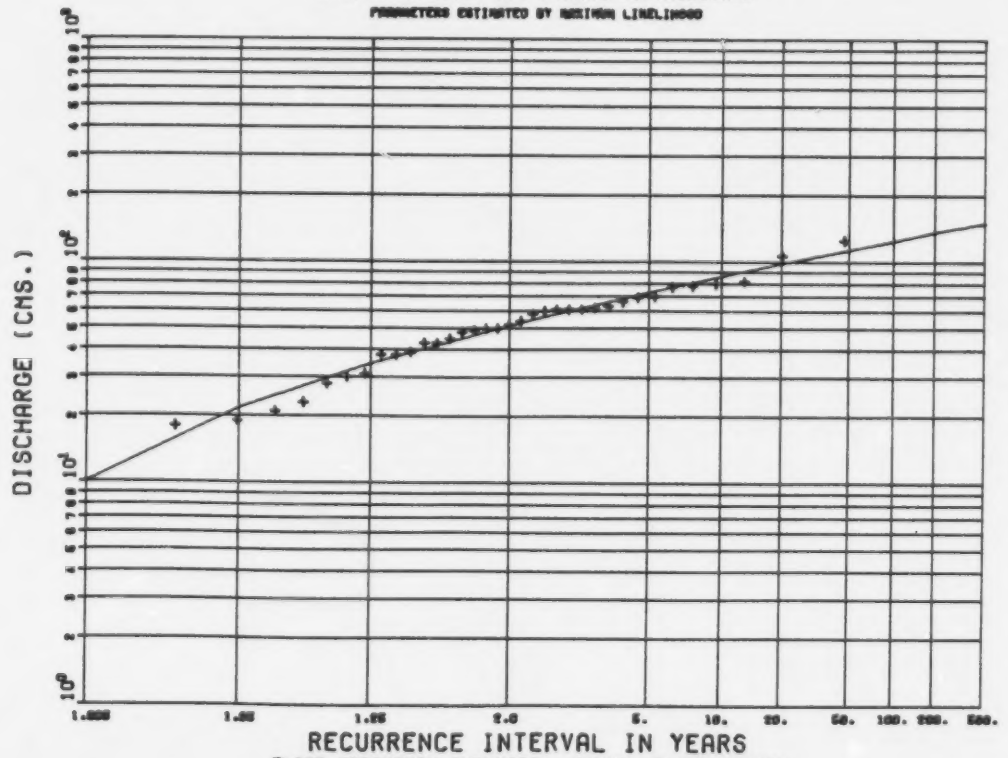
SAMPLE STATISTICS
MEAN = 54. S.D. = 23.6 C.S. = .8461 C.K. = 4.7004
SAMPLE STATISTICS (LOGS)
MEAN = 3.8971 S.D. = .4623 C.S. = -.4791 C.K. = 3.3091
SAMPLE MIN = 18. SAMPLE MAX = 125. N = 35

PARAMETERS FOR GUMBEL I A = .051983 U = 43.
PARAMETERS FOR LOGNORMAL P = 3.8971 S = .4623
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -29. M = 4.3847 S = .2791
STATISTICS OF LOG(X-A)
MEAN = 4.3847 S.D. = .2791 C.S. = -.0243 C.K. = 3.2686
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1108 B = .1742E+02 LOG(M) = 5.8270
ME= .3393E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1101 B = .1712E+02
LOG(M)= 5.7816 M = .3243E+03
DISTRIBUTION STATISTICS MEAN = 3.8971 S.D. = .4555 C.S. = -.4834

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	11.		15.		10.		12.		12.	
1.050	22.		23.		22.		22.		22.	
1.250	34.		33.		34.		34.		34.	
2.000	51.		49.		51.		51.		51.	
2.330	55.	7.56	54.	7.88	55.	7.71	55.	7.98	55.	8.40
5.000	72.	8.10	73.	9.10	72.	7.70	73.	7.78	73.	7.93
10.000	87.	8.67	89.	10.50	86.	8.75	86.	8.27	87.	8.54
20.000	101.	9.14	105.	12.00	98.	10.30	97.	9.39	99.	10.30
50.000	119.	9.65	127.	13.80	113.	12.60	111.	11.60	113.	13.60
100.000	132.	9.96	144.	15.00	124.	14.40	121.	13.60	123.	16.60
200.000	145.	10.23	162.	16.20	136.	16.30	130.	15.90	132.	19.80
500.000	163.	10.50	187.	17.70	150.	18.70	141.	18.90	144.	24.10

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SOUTH NATION RIVER AT SPENCERVILLE 02LB007
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I331.0

SOUTH NATION R. NEAR PLANTAGENET SPRINGS(1946-82)02LB005

DRAINAGE AREA : 3810.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1946 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	768.	262.	-.271	3.224
LN X SERIES	6.56	.45	-1.560	5.745

X(MIN)= 166. CMS. TOTAL SAMPLE SIZE= 37
X(MAX)= 1269. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

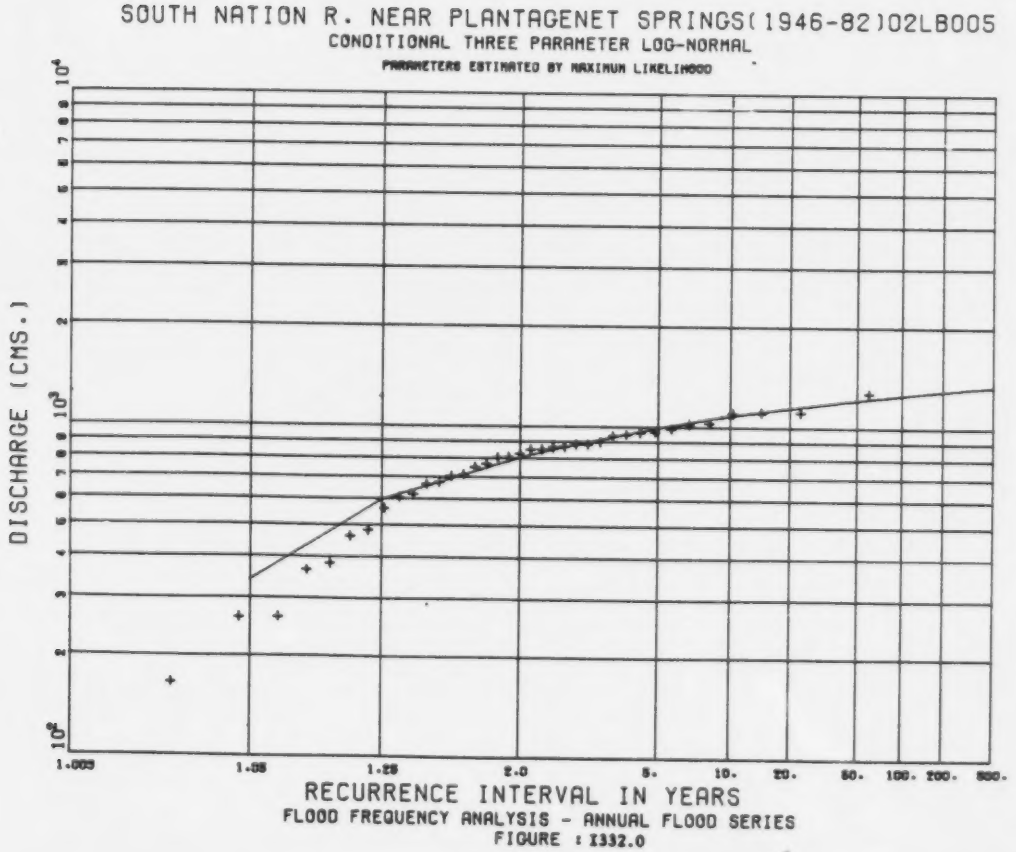
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	784.	245.	-.490	3.213
LN X SERIES	6.60	.39	-1.320	4.812
LN (X-A) SERIES	7.08	.20	-.013	3.310

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1998.4581 M = 7.0221 S = .2008

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	338.
1.250	.800	594.
2.000	.500	800.
2.330	.429	843.
5.000	.200	989.
10.000	.100	1080.
20.000	.050	1140.
50.000	.020	1210.
100.000	.010	1250.
200.000	.005	1290.
500.000	.002	1330.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I332.0

SOUTH NATION R. NEAR PLANTAGENET SPRINGS(1916-43)02LB005

DRAINAGE AREA : 3810.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1916 - 1943

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	743.	206.	.116	4.307
LN X SERIES	6.57	.31	-1.239	7.041

X(MIN)= 295. CMS. TOTAL SAMPLE SIZE= 28
X(MAX)= 1233. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	761.	186.	.600	4.036
LN X SERIES	6.61	.24	-.146	4.003
LN (X-A) SERIES	6.81	.28	.004	3.854

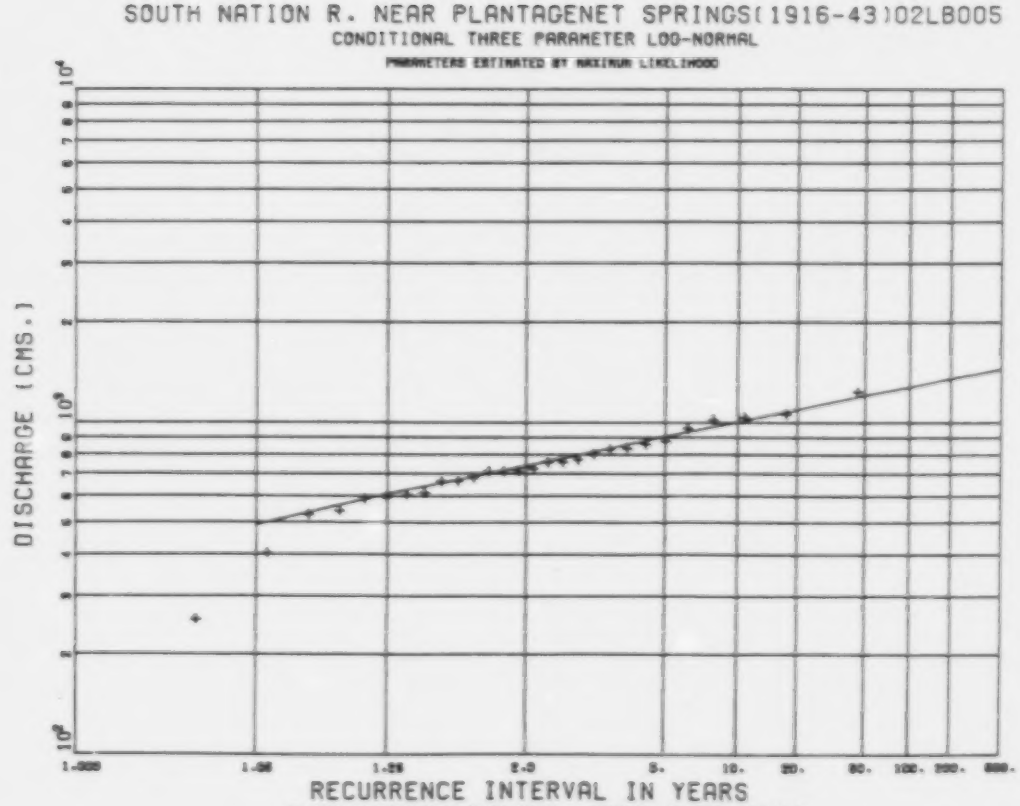
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -163.0399 M = 6.8092 S = .1992

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	489.
1.250	.800	607.
2.000	.500	735.
2.330	.429	768.
5.000	.200	903.
10.000	.100	1000.
20.000	.050	1090.
50.000	.020	1200.
100.000	.010	1270.
200.000	.005	1350.
500.000	.002	1440.

SOUTH NATION R. NEAR PLANTAGENET SPRINGS(1916-43)02LB005
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I332.1

SOUTH OTTER CREEK NEAR PORT BURWELL 02GC016

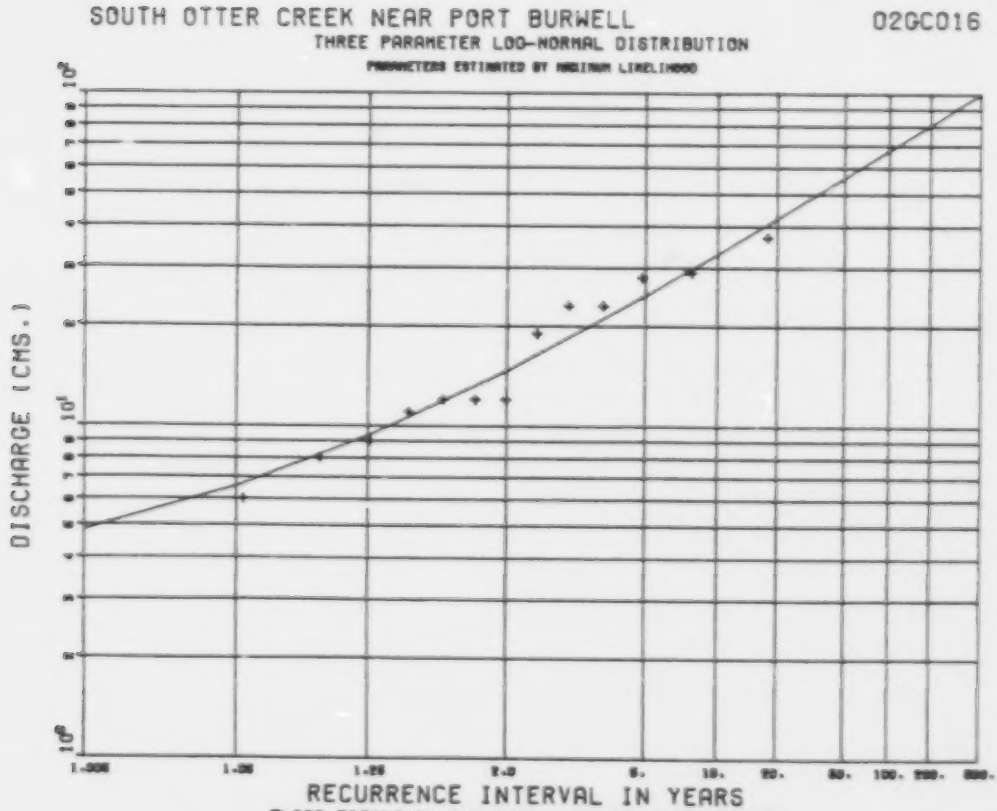
DRAINAGE AREA : 189.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1965 - 1977

SAMPLE STATISTICS
MEAN = 18. S.D. = 9.6 C.S. = .6921 C.K. = 3.3488
SAMPLE STATISTICS (LOGS)
MEAN = 2.7267 S.D. = .5625 C.S. = .0047 C.K. = 2.7787
SAMPLE MIN = 6. SAMPLE MAX = 37. N = 13

PARAMETERS FOR GUMBEL I A = .141536 U = 13.
PARAMETERS FOR LOGNORMAL M = 2.7267 S = .5625
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 3. M = 2.4456 S = .7383
STATISTICS OF LOG(X-A)
MEAN = 2.4456 S.D. = .7383 C.S. = -.2641 C.K. = 3.1228
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .6813 B = .1795E+06 LOG(R) = ********
ME= .4814-182
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0098 B = .3927E+04
LOG(R)F=**.***** M = .1861E-11
DISTRIBUTION STATISTICS MEAN = 2.7267 S.D. = .5625 C.S. = .0364

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	2.		4.		5.		4.		4.	
1.050	5.		6.		7.		6.		6.	
1.250	10.		10.		9.		10.		10.	
2.000	16.		15.		15.		16.		15.	
2.330	17.	14.30	17.	15.70	16.	17.20	17.	15.30	17.	16.90
5.000	24.	14.80	25.	18.20	25.	20.80	24.	17.70	25.	18.10
10.000	29.	15.50	31.	21.10	33.	25.70	31.	21.30	31.	21.50
20.000	34.	16.20	39.	23.90	42.	31.10	37.	25.00	39.	26.40
50.000	41.	16.90	46.	27.50	56.	38.50	47.	33.70	49.	34.40
100.000	46.	17.30	57.	30.80	67.	43.60	55.	40.46	57.	41.20
200.000	51.	17.70	65.	32.40	80.	48.70	63.	47.60	65.	48.50
500.000	57.	18.13	77.	35.40	100.	55.10	74.	57.50	78.	58.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I333.0

SOUTH PARKHILL CREEK NEAR PARKHILL 02FF004

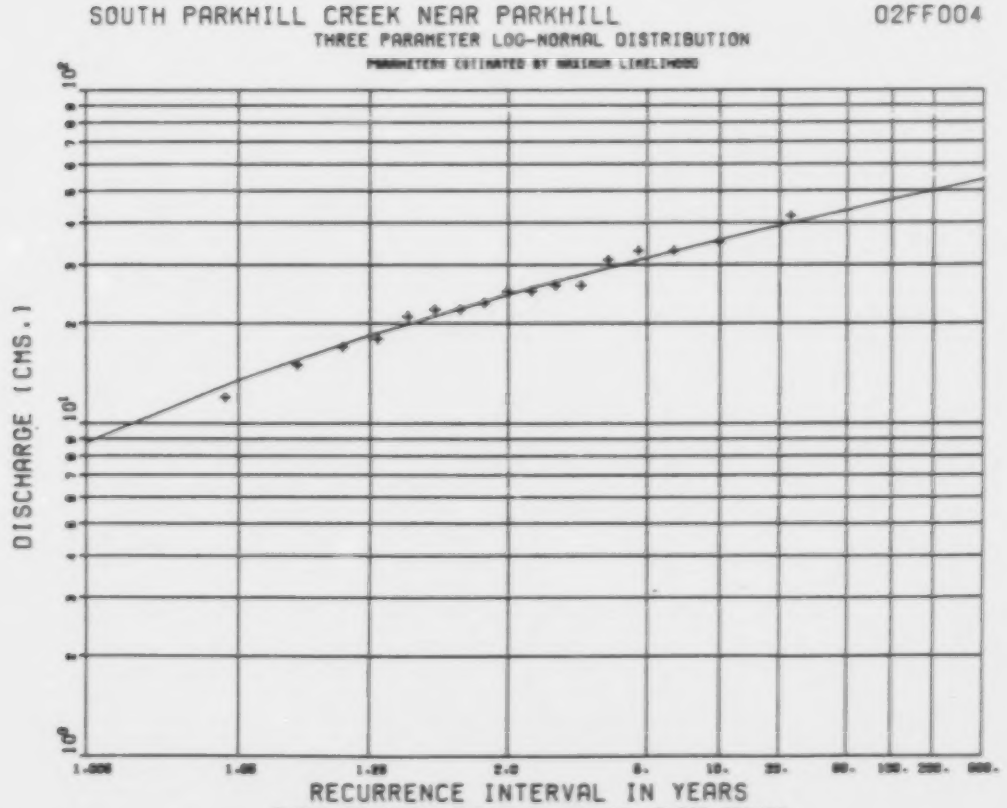
DRAINAGE AREA = 41.4 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 24. S.D. = 7.8 C.S. = .4177 C.K. = 3.6258
SAMPLE STATISTICS (LOGS)
MEAN = 3.1737 S.D. = .3238 C.S. = -.3588 C.K. = 3.6550
SAMPLE MIN = 12. SAMPLE MAX = 42. N = 17

PARAMETERS FOR GUMBEL I A = .151884 U = 21.
PARAMETERS FOR LOGNORMAL M = 3.1737 S = .3238
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -16. M = 3.6961 S = .1984
STATISTICS OF LOG(X-A)
MEAN = 3.6961 S.D. = .1984 C.S. = -.8344 C.K. = 3.4228
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8981 B = -.3107E+02 LOG(M) = 4.9705
ME= .1433E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.8770 B = -.1588E+02
LOG(M)= 4.4728 M = .8768E+02
DISTRIBUTION STATISTICS MEAN = 3.1737 S.D. = .3162 C.S. = -.4868

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	18.		18.		9.		9.		9.	
1.050	14.		14.		14.		14.		14.	
1.250	18.		18.		18.		19.		18.	
2.000	24.		24.		24.		25.		24.	
2.330	25.	8.07	25.	7.92	25.	8.04	25.	7.95	26.	8.43
5.000	31.	9.23	31.	9.14	31.	9.12	31.	7.74	32.	8.25
10.000	36.	10.20	36.	10.60	36.	9.25	35.	8.22	36.	9.11
20.000	41.	11.10	41.	12.00	39.	10.50	38.	9.33	39.	10.00
50.000	47.	12.00	47.	13.80	44.	13.60	42.	11.60	44.	14.30
100.000	52.	12.60	51.	15.10	47.	15.90	45.	13.60	47.	17.20
200.000	57.	13.00	55.	16.30	50.	17.80	47.	15.70	49.	20.60
500.000	63.	13.50	61.	17.80	54.	20.60	50.	18.80	53.	24.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1334.0

SOUTH RIVER ABOVE TRUISLER CHUTE 02DD002

DRAINAGE AREA : 420.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1920 - 1952

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	37.	13.	.284	3.906
LN X SERIES	3.55	.39	-1.075	5.768

X(MIN)= 10. CMS. TOTAL SAMPLE SIZE= 33
X(MAX)= 68. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	38.	12.	.548	3.903
LN X SERIES	3.59	.32	-.295	3.320
LN (X-A) SERIES	4.06	.21	-.025	3.278

CONDITIONAL PROBABILITY FUNCTION (MAXIPUM LIKELIHOOD)
PARAMETERS A = -17.6505 M = 3.9573 S = .2105

FLOOD FREQUENCY REGIME

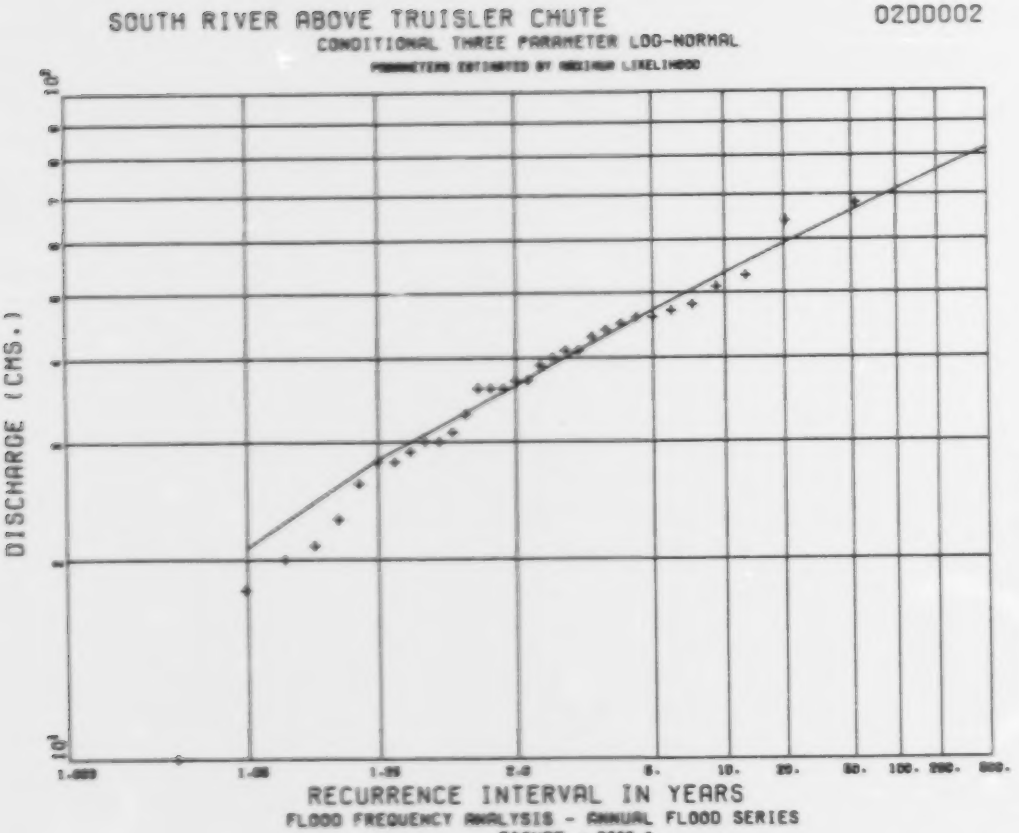
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	21.
1.250	.800	28.
2.000	.500	36.
2.330	.429	39.
5.000	.200	47.
10.000	.100	53.
20.000	.050	59.
50.000	.020	66.
100.000	.010	71.
200.000	.005	76.
500.000	.002	82.

SOUTH RIVER ABOVE TRUISLER CHUTE 02DD002

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I335.0

SOUTH RIVER NEAR NIPISSING 02DD005

DRAINAGE AREA : 787.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1937 - 1982

SAMPLE STATISTICS
MEAN = 94. S.D. = 32.5 C.S. = .8817 C.K. = 3.4102
SAMPLE STATISTICS (LOGS)
MEAN = 4.4900 S.D. = .3313 C.S. = .2476 C.K. = 2.5804
SAMPLE MIN = 48. SAMPLE MAX = 175. N = 46

PARAMETERS FOR GUMBEL I A = .041083 U = 80.
PARAMETERS FOR LOGNORMAL M = 4.4900 S = .3313
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 29. M = 4.8505 S = .5068
STATISTICS OF LOG(X-A)
MEAN = 4.8505 S.D. = .5068 C.S. = -.1141 C.K. = 2.6759
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8410 B = .6523E+02 LOG(M) = 1.8144
ME= .6137E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0819 B = .1634E+02
LOG(M)= 3.1517 M = .2338E+02
DISTRIBUTION STATISTICS MEAN = 4.4900 S.D. = .3311 C.S. = .4947

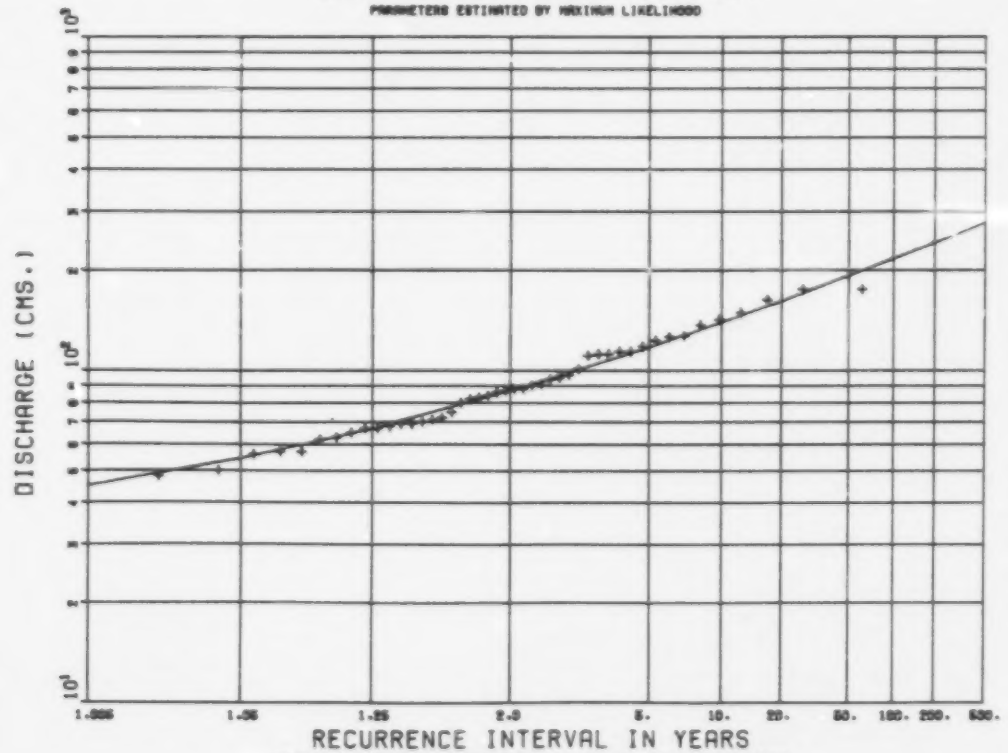
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	79.		38.		45.		44.		41.	
1.054	82.		52.		54.		54.		53.	
1.250	88.		67.		67.		67.		67.	
2.000	88.		89.		87.		87.		88.	
2.330	94.	4.87	95.	4.92	92.	5.39	92.	5.28	93.	5.36
5.000	116.	5.57	116.	5.68	117.	6.53	116.	6.42	117.	6.88
10.000	134.	6.18	136.	6.59	139.	8.20	138.	8.15	137.	7.47
20.000	152.	6.69	154.	7.49	161.	10.20	160.	10.40	157.	9.43
50.000	174.	7.23	176.	8.61	192.	13.80	191.	13.80	184.	12.60
100.000	191.	7.58	193.	9.40	216.	16.20	217.	16.60	204.	15.20
200.000	208.	7.87	209.	10.10	241.	17.30	244.	19.50	226.	18.00
500.000	231.	8.20	231.	11.10	276.	20.20	283.	23.60	256.	21.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SOUTH RIVER NEAR NIPISSING 02DD005

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I336.0
I-353

SOUTH RIVER NEAR POWASAN 0200001

DRAINAGE AREA : 791.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1914 - 1936

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	101.	34.	.916	3.484
LN X SERIES	4.56	.37	-.681	4.374

X(MIN)= 39. CMS. TOTAL SAMPLE SIZE= 23
X(MAX)= 174. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	104.	32.	.507	3.496
LN X SERIES	4.60	.32	-.243	3.736
LN (X-A) SERIES	4.88	.24	-.034	3.472

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -31.6820 M = 6.5245 S = .2366

FLOOD FREQUENCY REGIME

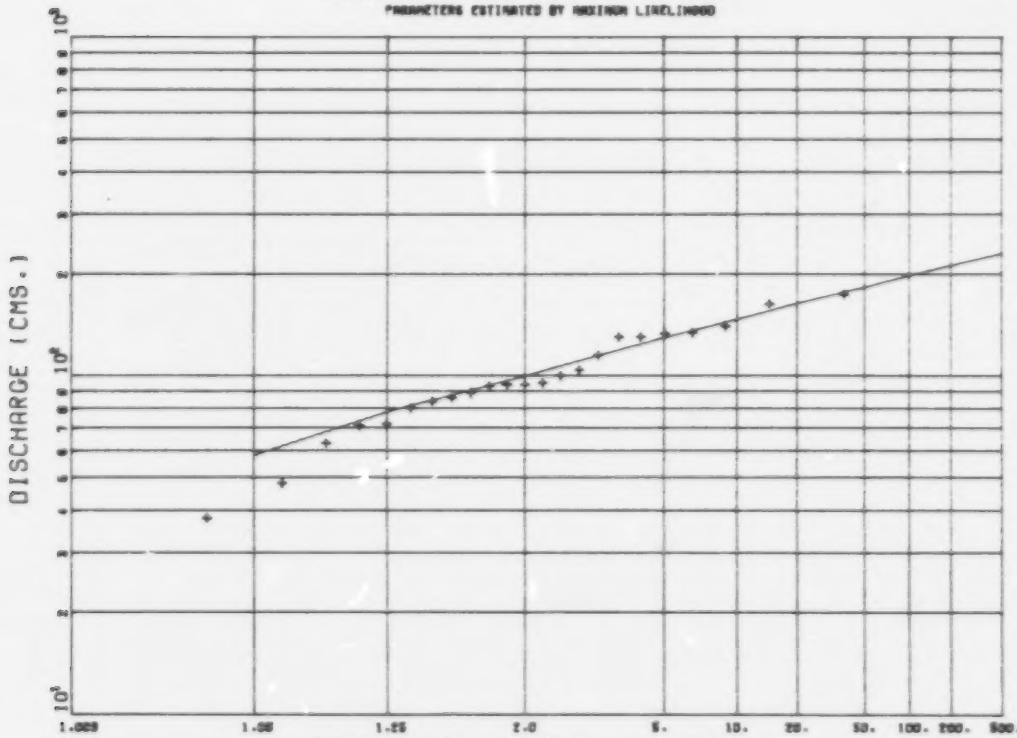
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.250	.952	59.
1.250	.800	78.
2.000	.500	99.
2.330	.429	114.
5.000	.200	129.
10.000	.100	146.
20.000	.050	157.
50.000	.020	172.
100.000	.010	187.
200.000	.005	211.
500.000	.002	229.

SOUTH RIVER NEAR POWASAN 0200001

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I337.0

SOUTH SAUGEEN RIVER NEAR HANOVER 02FC012

DRAINAGE AREA : 635.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1972 - 1982

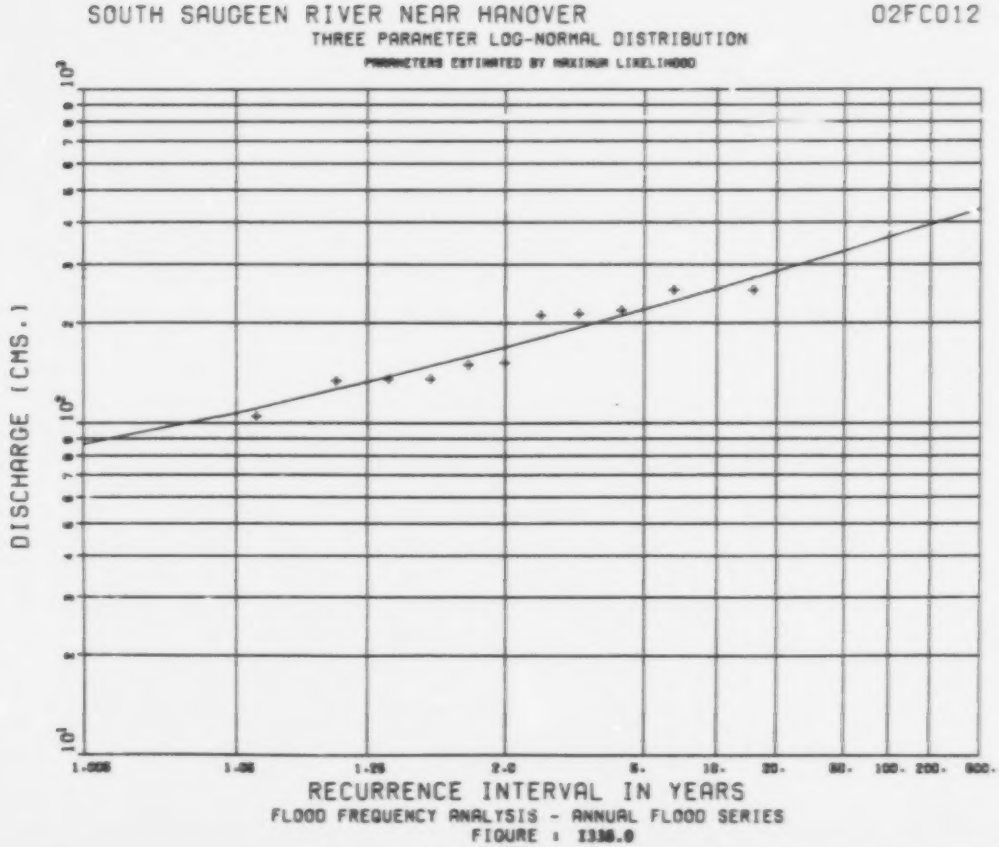
SAMPLE STATISTICS
MEAN = 170. S.D. = 51.8 C.S. = .2342 C.K. = 2.5888
SAMPLE STATISTICS (LOGS)
MEAN = 5.1418 S.D. = .2965 C.S. = -.0543 C.K. = 2.7888
SAMPLE MIN = 105. SAMPLE MAX = 251. N = 11

PARAMETERS FOR GUMBEL I A = .024125 U = 154.
PARAMETERS FOR LOGNORMAL M = 5.1418 S = .2965
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 39. M = 4.8668 S = .3897
STATISTICS OF LOG(X-A)
MEAN = 4.8668 S.D. = .3897 C.S. = -.1726 C.K. = 2.9886
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8881 B = .1354E+04 LOG(M) =16.8537
ME= .9376E+07

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	85.		88.		87.		0.		79.	
1.050	108.		105.		107.		0.		105.	
1.250	134.		133.		133.		0.		133.	
2.000	169.		171.		169.		0.		171.	
2.330	178.	8.91	180.	9.01	178.	9.77	0.	0.00	181.	9.66
5.000	216.	10.40	220.	10.46	219.	11.20	0.	0.00	223.	10.30
10.000	247.	11.70	250.	12.10	253.	13.80	0.	0.00	256.	12.00
20.000	277.	12.80	279.	13.70	286.	17.00	0.	0.00	277.	14.60
50.000	316.	13.90	314.	15.80	329.	21.70	0.	0.00	312.	19.00
100.000	345.	14.70	341.	17.20	361.	25.30	0.	0.00	337.	22.80
200.000	373.	15.30	367.	18.60	394.	29.00	0.	0.00	362.	26.80
500.000	411.	16.00	402.	20.30	438.	33.80	0.	0.00	394.	32.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I338.0

SPANISH RIVER AT ESPANOLA 02CE001

DRAINAGE AREA : 11400.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1948 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	632.	288.	.839	3.945
LN X SERIES	6.37	.42	-.411	4.249

X(MIN)= 175. CMS. TOTAL SAMPLE SIZE= 35
X(MAX)= 1336. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	646.	281.	.984	4.010
LN X SERIES	6.40	.37	.151	3.997
LN (X-A) SERIES	6.21	.45	-.047	3.216

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 98.1788 M = 6.2076 S = .4521

FLOOD FREQUENCY REGIME

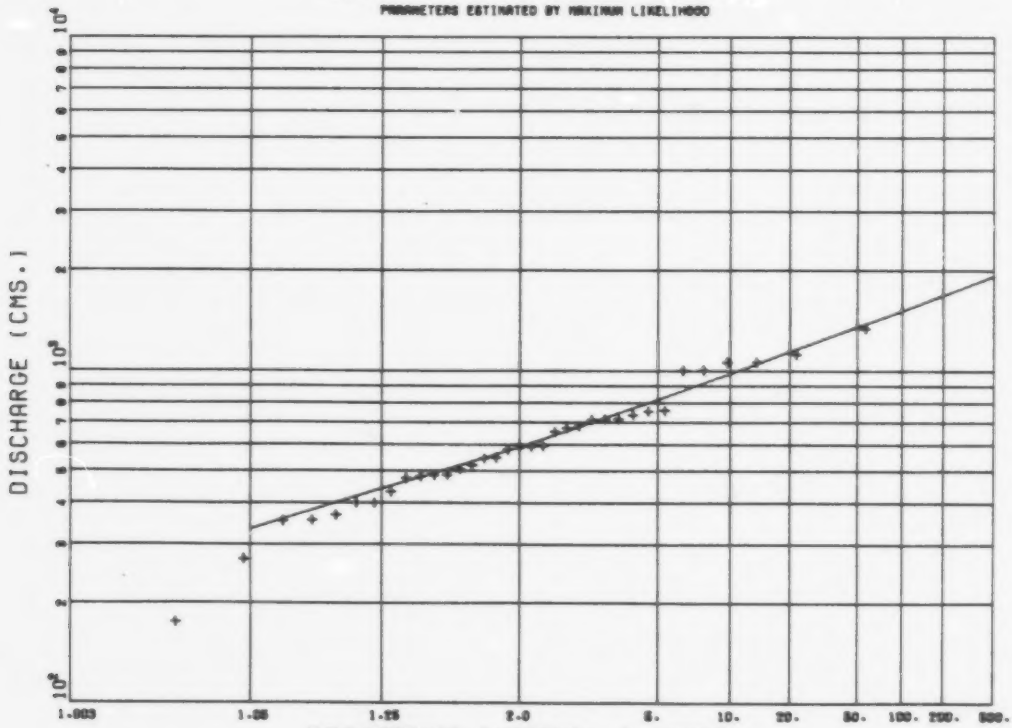
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	333.
1.250	.800	441.
2.000	.500	587.
2.330	.429	629.
5.000	.200	818.
10.000	.100	978.
20.000	.050	1140.
50.000	.020	1350.
100.000	.010	1510.
200.000	.005	1640.
500.000	.002	1920.

SPANISH RIVER AT ESPANOLA 02CE001

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



RECURRENCE INTERVAL IN YEARS

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I339.0

SPANISH RIVER AT HIGH FALLS 02CE004

DRAINAGE AREA : 61000.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1921 - 1982

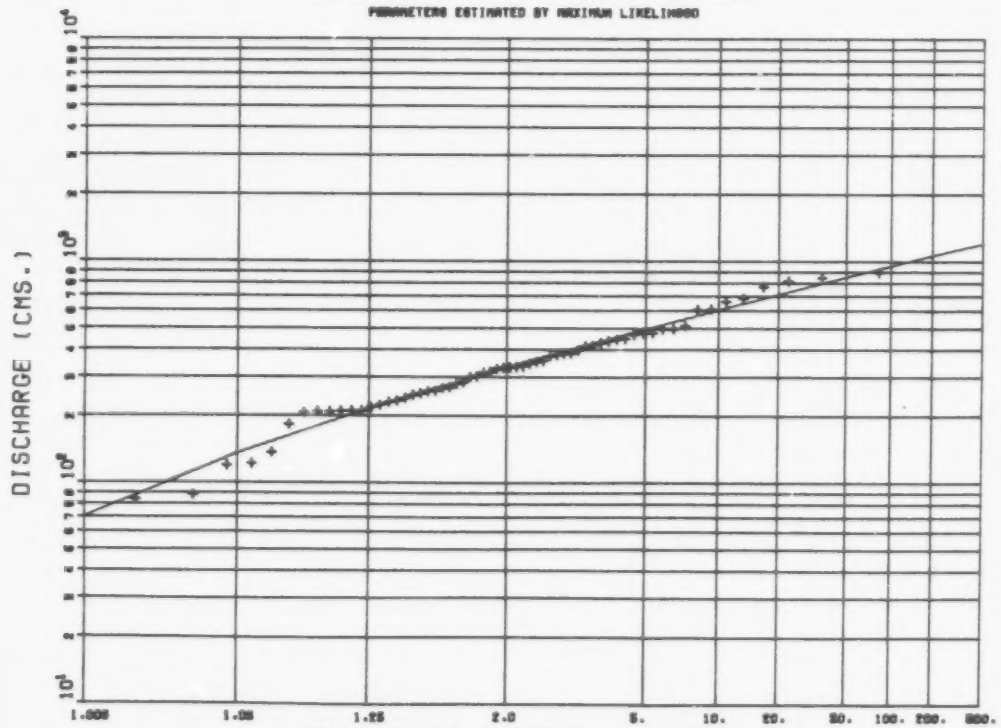
SAMPLE STATISTICS
MEAN = 364. S.D. = 181.2 C.S. = 1.1168 C.K. = 4.3238
SAMPLE STATISTICS (LOGS)
MEAN = 5.7760 S.D. = .5071 C.S. = -.3532 C.K. = 3.6367
SAMPLE MIN = 84. SAMPLE MAX = 893. N = 62

PARAMETERS FOR GUMBEL I A = .007383 U = 284.
PARAMETERS FOR LOGNORMAL M = 5.7760 S = .5071
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -77. M = 6.0896 S = .3977
STATISTICS OF LOG(X-A)
MEAN = 6.0096 S.D. = .3977 C.S. = .0030 C.K. = 3.2604
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0096 B = .3206E+02 LOG(M) = 8.6475
ME= .5696E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0786 B = .4094E+02
LOG(M)F= 8.9926 M = .8043E+04
DISTRIBUTION STATISTICS MEAN = 5.7760 S.D. = .5027 C.S. = -.3126

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	58.		87.		70.		76.		74.	
1.050	133.		148.		135.		135.		134.	
1.250	219.		218.		215.		213.		213.	
2.000	333.		325.		331.		331.		332.	
2.330	362.	6.01	353.	6.49	361.	6.52	361.	6.76	363.	6.92
5.000	487.	6.37	494.	7.50	493.	6.79	495.	6.83	497.	6.81
10.000	588.	6.76	618.	8.69	602.	7.90	602.	7.53	604.	7.49
20.000	686.	7.09	743.	9.88	707.	9.27	703.	8.84	704.	8.96
50.000	812.	7.45	914.	11.40	845.	11.20	831.	11.20	823.	11.70
100.000	907.	7.67	1050.	12.40	951.	13.20	925.	13.30	919.	14.10
200.000	1000.	7.85	1190.	13.40	1060.	14.80	1020.	15.60	1010.	16.70
500.000	1130.	8.06	1390.	14.60	1200.	16.90	1140.	18.70	1120.	20.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SPANISH RIVER AT HIGH FALLS 02CE004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I340.0
I-356

SPEED RIVER BELOW GUELPH (1951-79 :76-79 'NAT.') 02GA015

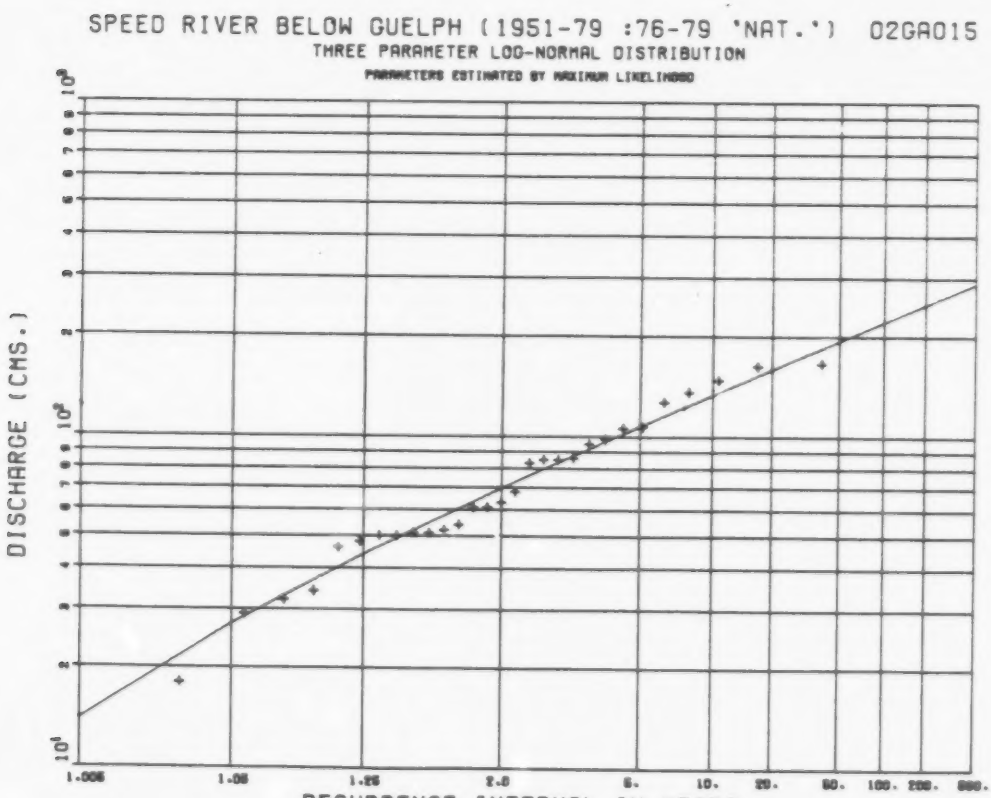
DRAINAGE AREA = 593.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1951 - 1979

SAMPLE STATISTICS
MEAN = 78. S.D. = 48.2 C.S. = .7956 C.K. = 3.1987
SAMPLE STATISTICS (LOGS)
MEAN = 4.2191 S.D. = .5413 C.S. = -.2965 C.K. = 3.2829
SAMPLE MIN = 18. SAMPLE MAX = 166. N = 29

PARAMETERS FOR GUMBEL I A = .032927 U = 60.
PARAMETERS FOR LOGNORMAL M = 4.2191 S = .5413
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -11. M = 4.3871 S = .4556
STATISTICS OF LOG(X-A)
MEAN = 4.3871 S.D. = .4556 C.S. = -.0763 C.K. = 2.9495
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0802 B = .4551E+02 LOG(M) = 7.8708
ME= .2628E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1243 B = .1868E+02
LOG(M)= 6.5310 M = .6861E+03
DISTRIBUTION STATISTICS MEAN = 4.2191 S.D. = .5361 C.S. = -.4638

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	9.		17.		14.		14.		15.	
1.050	26.		28.		27.		26.		27.	
1.250	45.		43.		44.		44.		44.	
2.000	71.		68.		69.		71.		70.	
2.330	77.	9.28	75.	10.10	76.	10.30	78.	10.30	77.	10.80
5.000	105.	9.67	107.	11.70	107.	10.40	108.	10.10	108.	10.80
10.000	120.	10.20	136.	13.60	133.	12.70	131.	10.80	133.	12.00
20.000	150.	10.60	166.	15.40	159.	15.10	152.	12.30	158.	14.40
50.000	170.	11.10	207.	17.70	194.	18.50	170.	15.30	189.	18.70
100.000	190.	11.40	239.	19.30	221.	21.10	197.	18.00	213.	22.50
200.000	220.	11.70	274.	20.90	249.	23.70	215.	20.90	236.	26.60
500.000	248.	12.00	323.	22.80	288.	27.80	237.	25.00	267.	32.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I341.0

SPEED RIVER NEAR ARMSTRONG MILLS 02GA040

DRAINAGE AREA : 167.8 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1974 - 1983

SAMPLE STATISTICS
MEAN = 65. S.D. = 29.3 C.S. = .3560 C.K. = 3.3944
SAMPLE STATISTICS (LOGS)
MEAN = 4.0801 S.D. = .4817 C.S. = -.2721 C.K. = 3.1721
SAMPLE MIN = 28. SAMPLE MAX = 114. N = 10

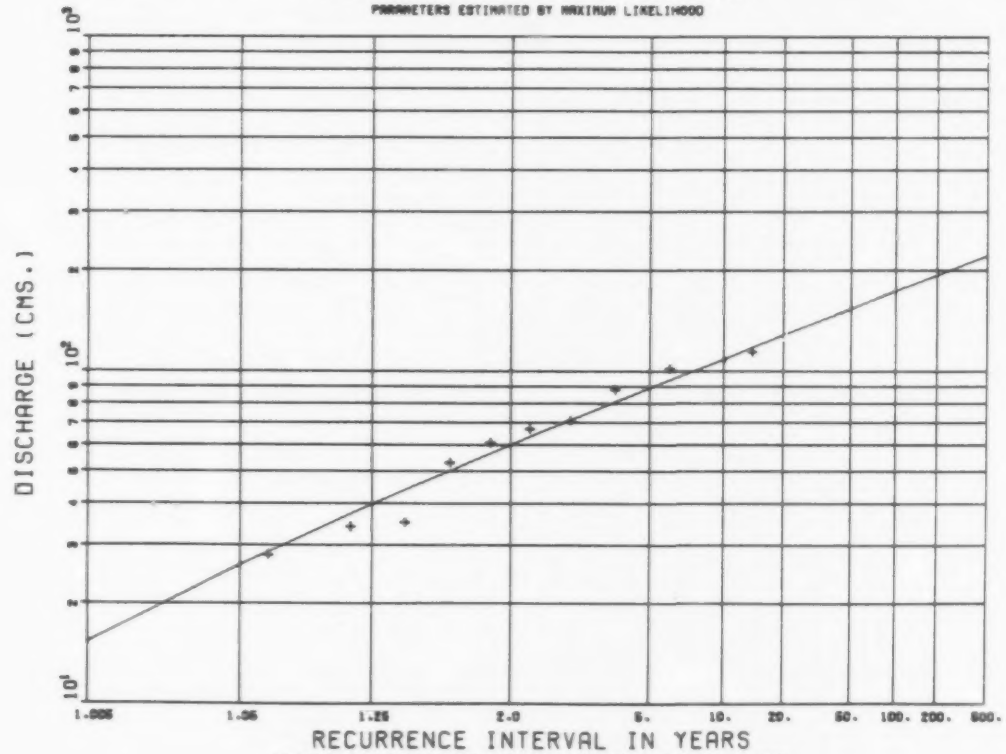
PARAMETERS FOR GUMBEL I A = .042944 U = 52.
PARAMETERS FOR LOGNORMAL M = 4.0801 S = .4817
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -7. M = 4.2049 S = .4250
STATISTICS OF LOG(X-A)
MEAN = 4.2049 S.D. = .4250 C.S. = -.2041 C.K. = 3.1508
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8655 B = .5402E+02 LOG(P) = 7.6205
ME= .2039E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	13.		17.		15.		0.		15.	
1.050	26.		27.		26.		0.		26.	
1.250	41.		39.		40.		0.		40.	
2.000	60.		59.		60.		0.		61.	
2.330	65.	14.30	64.	15.40	65.	15.80	0.	0.00	66.	16.40
5.000	87.	15.30	89.	17.70	89.	16.90	0.	0.00	89.	16.50
10.000	104.	16.30	110.	20.60	106.	19.90	0.	0.00	108.	18.40
20.000	121.	17.20	131.	23.40	126.	23.70	0.	0.00	126.	22.10
50.000	143.	18.10	159.	26.90	153.	29.30	0.	0.00	140.	26.70
100.000	159.	18.70	181.	29.30	173.	33.50	0.	0.00	165.	34.50
200.000	175.	19.20	205.	31.70	193.	37.80	0.	0.00	181.	40.70
500.000	197.	19.70	237.	34.60	221.	43.20	0.	0.00	202.	49.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SPEED RIVER NEAR ARMSTRONG MILLS 02GA040
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I342.0

SPENCER CREEK AT DUNDAS CROSSING (1961-70) 02HB010

DRAINAGE AREA : 166.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1961 - 1970

SAMPLE STATISTICS
MEAN = 22. S.D. = 8.5 C.S. = .1947 C.K. = 2.9684
SAMPLE STATISTICS (LOGS)
MEAN = 2.9961 S.D. = .4251 C.S. = -.4348 C.K. = 3.9453
SAMPLE MIN = 9. SAMPLE MAX = 34. N = 10

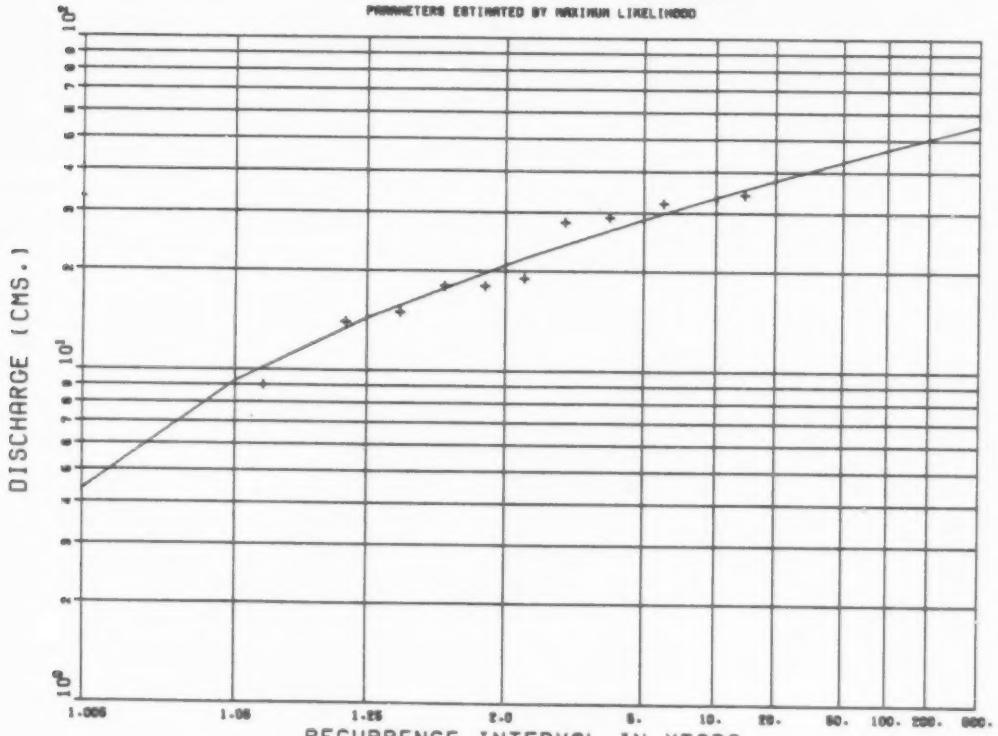
PARAMETERS FOR GUMBEL I A = .143387 U = 18.
PARAMETERS FOR LOGNORMAL M = 2.9961 S = .4251
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -16. N = 3.6046 S = .2289
STATISTICS OF LOG(X-A)
MEAN = 3.6046 S.D. = .2289 C.S. = -.8968 C.K. = 3.2798
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8523 B = .212E+02 LOG(M) = 4.9548
ME= .1418E+03

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	6.		7.		4.		0.		6.	
1.050	10.		10.		9.		0.		9.	
1.250	14.		14.		14.		0.		14.	
2.000	20.		20.		21.		0.		21.	
2.330	22.	12.98	22.	13.50	22.	13.48	0.	0.00	22.	14.48
5.000	29.	14.10	29.	15.60	29.	13.20	0.	0.00	29.	13.88
10.000	33.	14.38	33.	18.08	33.	14.48	0.	0.00	34.	16.00
20.000	38.	16.30	38.	20.60	38.	17.48	0.	0.00	38.	18.88
50.000	45.	17.38	46.	23.78	43.	21.38	0.	0.00	43.	23.80
100.000	50.	17.98	54.	25.98	47.	24.40	0.	0.00	47.	28.88
200.000	55.	18.58	60.	27.90	50.	27.48	0.	0.00	50.	34.20
500.000	61.	19.10	68.	30.50	55.	31.68	0.	0.00	55.	41.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

SPENCER CREEK AT DUNDAS CROSSING (1961-70) 02HB010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I343.0

SPENCER CREEK NEAR WESTOVER 02HB015

DRAINAGE AREA : 63.5 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1982

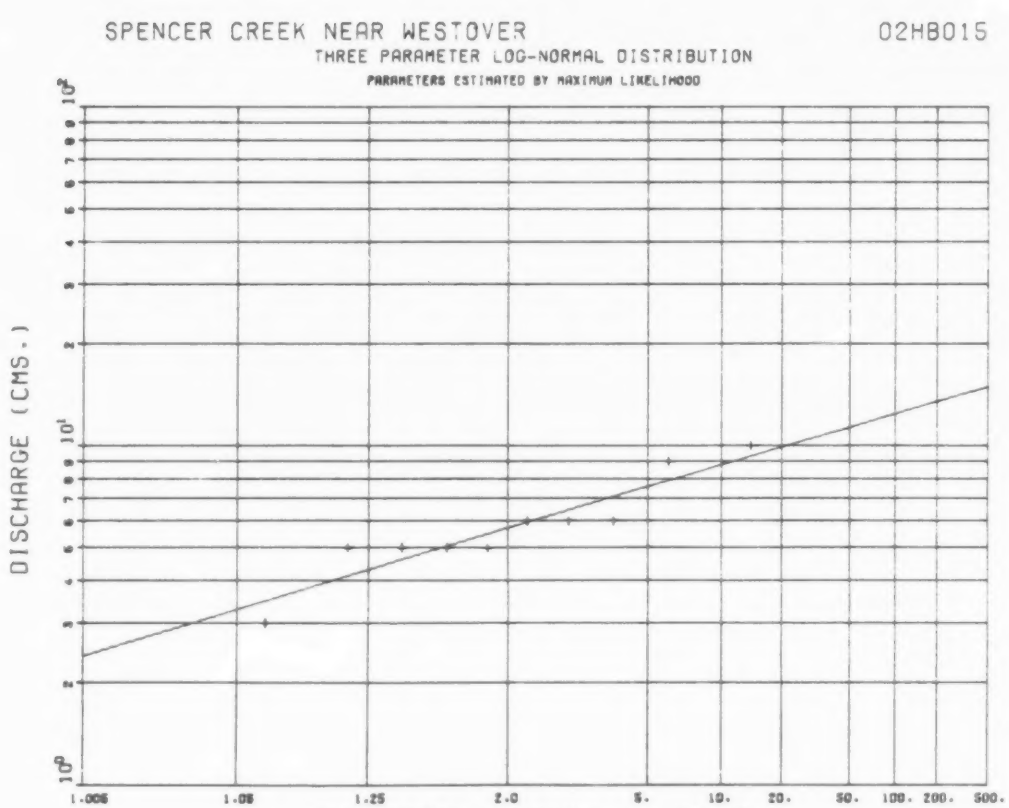
SAMPLE STATISTICS
MEAN = 5. S.D. = 2.1 C.S. = .3605 C.K. = 5.1665
SAMPLE STATISTICS (LOGS)
MEAN = 1.7411 S.D. = .3355 C.S. = -.0080 C.K. = 5.4131
SAMPLE MIN = 3. SAMPLE MAX = 13. N = 19

PARAMETERS FOR GUMBEL I A = .643447 U = 5.
PARAMETERS FOR LOGNORMAL M = 1.7411 S = .3355
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -3. M = 1.7586 S = .3297
STATISTICS OF LOG(X-A)
MEAN = 1.7586 S.D. = .3297 C.S. = .0128 C.K. = 5.3914
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0013 B = .6247E+05 LOG(M) =85.5979
ME= .1435E+38

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	3.		2.		2.		0.		2.	
1.250	3.		3.		3.		0.		3.	
1.050	4.		4.		4.		0.		4.	
2.000	6.		6.		5.		0.		5.	
2.330	6.	10.40	6.	10.70	6.	11.30	0.	0.00	6.	11.50
5.000	7.	11.90	8.	12.30	8.	12.90	0.	0.00	8.	12.40
10.000	9.	13.20	9.	14.30	9.	14.60	0.	0.00	9.	14.50
20.000	10.	14.60	11.	16.30	10.	17.90	0.	0.00	10.	17.30
50.000	11.	15.50	11.	18.70	11.	22.20	0.	0.00	11.	23.20
100.000	12.	16.20	12.	20.40	12.	25.70	0.	0.00	12.	27.60
200.000	13.	16.80	14.	22.05	14.	29.10	0.	0.00	14.	32.70
500.000	15.	17.50	15.	24.10	15.	34.00	0.	0.00	15.	39.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1344.0

STALKER CREEK NEAR ORONO 02HD233

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. ARE NOT AFFECTED)

DRAINAGE AREA 21.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1968 - 1977

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	812.	470.	1.001	7.419
LN X SERIES	6.53	.66	-.809	6.832

X(MIN)= 171.CMS.(*100) TOTAL SAMPLE SIZE= 10
X(MAX)= 1841.CMS.(*100) NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	883.	438.	1.307	8.802
LN X SERIES	6.68	.47	.188	5.660
LN (X-A) SERIES	6.24	.72	-.276	5.337

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 244.2839 M = 6.2443 S = .7240

FLOOD FREQUENCY REGIME

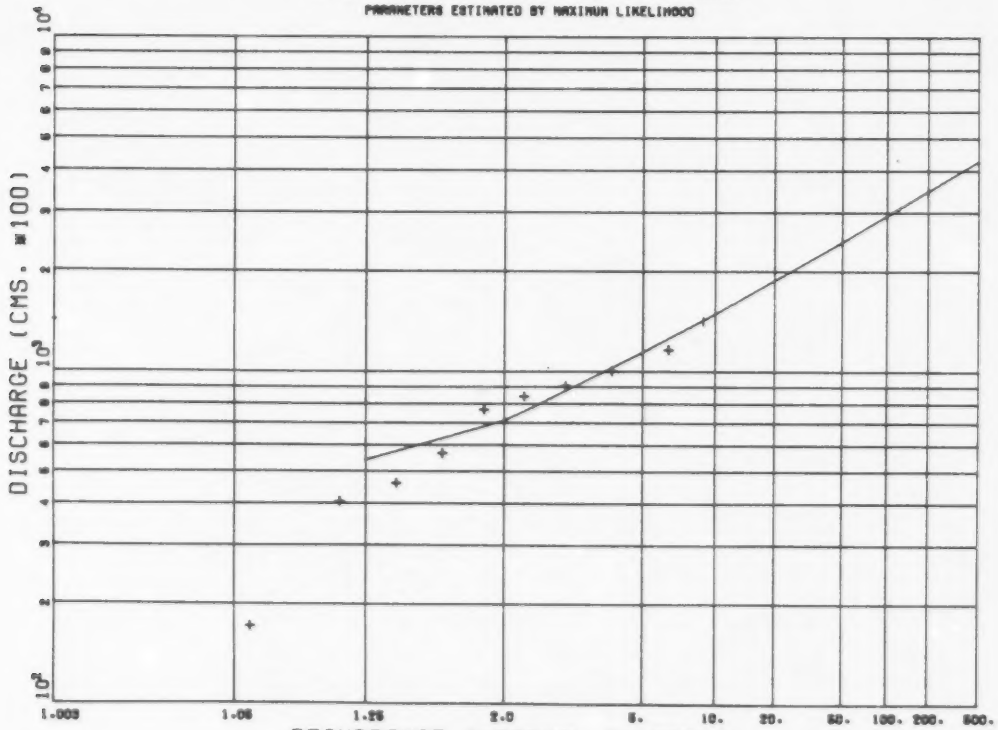
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.(*100)
1.003	.997	-
1.050	.952	-
1.250	.800	540.
2.000	.500	710.
2.330	.429	781.
5.000	.200	1140.
10.000	.100	1490.
20.000	.050	1880.
50.000	.020	2450.
100.000	.010	2940.
200.000	.005	3480.
500.000	.002	4250.

STALKER CREEK NEAR ORONO 02HD233

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I345.0

STEEL RIVER NEAR TERRACE BAY 02BA002

DRAINAGE AREA : 1190.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	75.	23.	-.588	4.268
LN X SERIES	4.27	.36	-1.243	5.810

X(MIN)= 31. CMS. TOTAL SAMPLE SIZE= 13
X(MAX)= 109. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

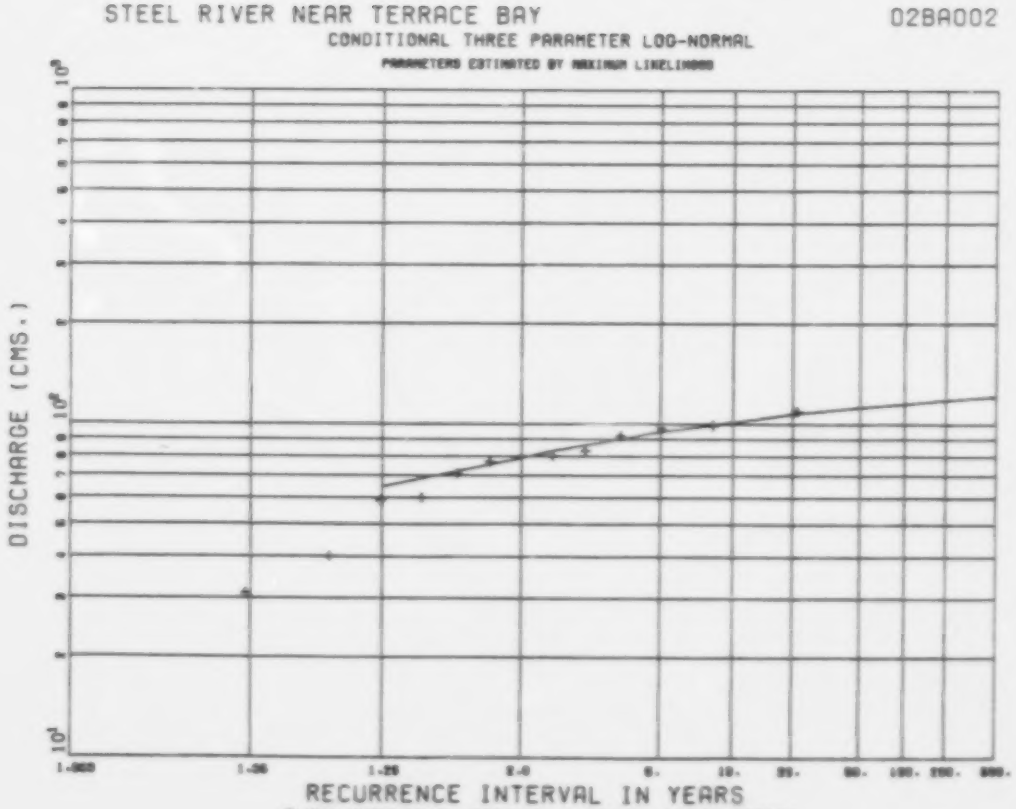
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	79.	19.	-.463	4.742
LN X SERIES	4.34	.28	-1.126	6.465
LN (X-A) SERIES	4.46	.22	-.051	4.408

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 167.1218 M = 4.4574 S = .2289

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	65.
2.000	.500	79.
2.330	.429	83.
5.000	.200	95.
10.000	.100	101.
20.000	.050	107.
50.000	.020	112.
100.000	.010	115.
200.000	.005	118.
500.000	.002	121.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I346.0

STURGEON CREEK NEAR LEAMINGTON 02GH001

DRAINAGE AREA 14.2 SQ. KM.
--NATURAL FLOW---
PERIOD OF RECORD: 1972 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	17.	10.	.823	2.893
LN X SERIES	2.67	.68	-.945	6.689
X(MIN)= 1. CMS.		TOTAL SAMPLE SIZE= 12		
X(MAX)= 37. CMS.		NO. OF OUTLIERS= 1		

AFTER REMOVAL OF OUTLIER(S)

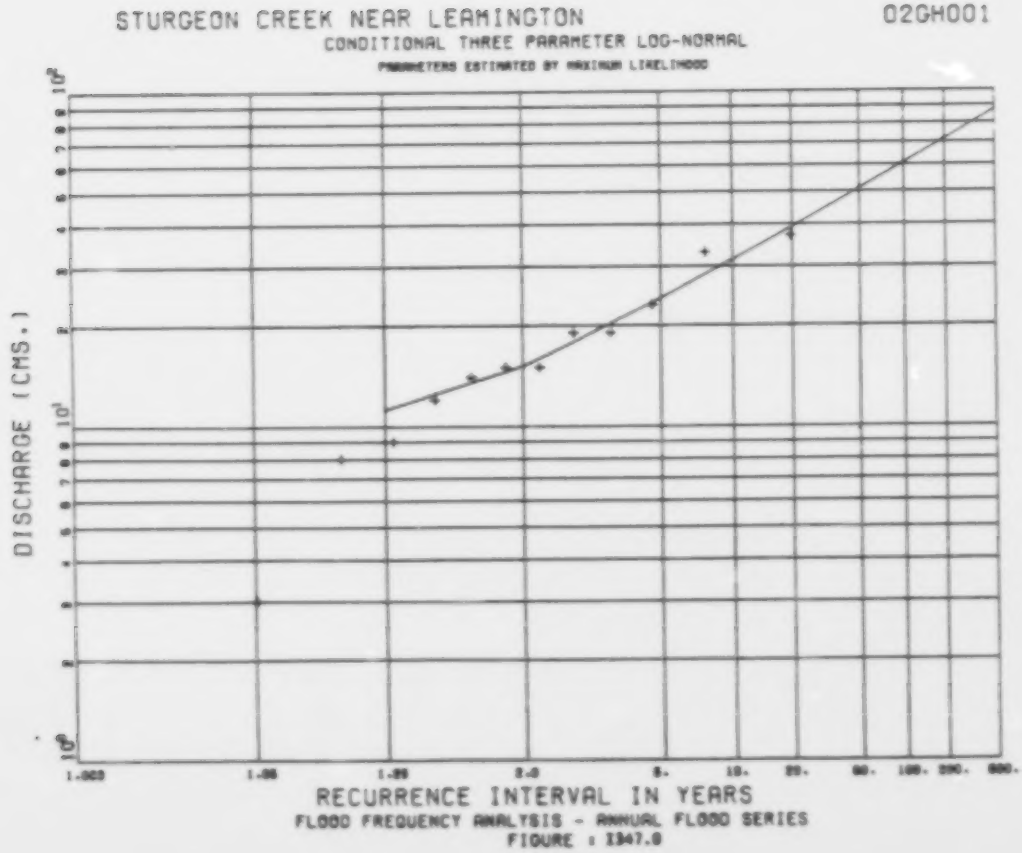
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	19.	9.	1.554	5.199
LN X SERIES	2.81	.48	-.289	4.384
LN (X-A) SERIES	2.43	.70	-.211	4.926

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAPETERS A = 4.5725 M = 2.4385 S = .6968

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	11.
2.000	.500	15.
2.330	.429	17.
5.000	.200	24.
10.000	.100	34.
20.000	.050	44.
50.000	.020	61.
100.000	.010	74.
200.000	.005	87.
500.000	.002	107.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I347.0

STURGEON RIVER AT CRYSTAL FALLS 02DC003

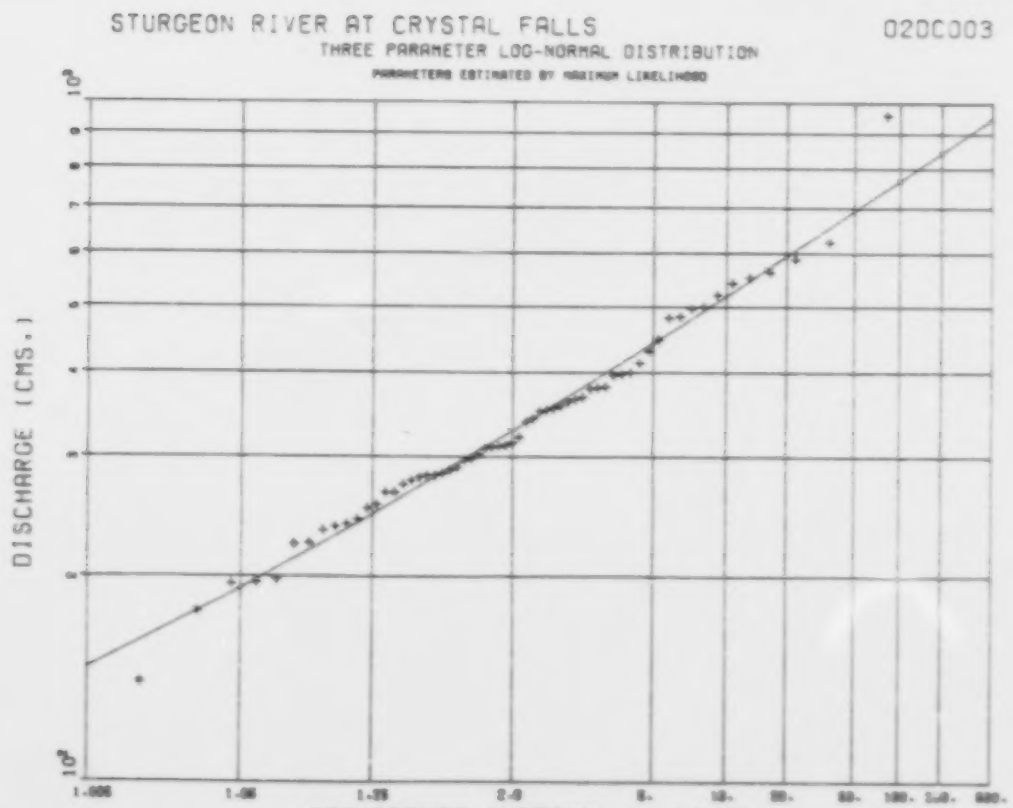
DRAINAGE AREA = 6660.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1922 - 1982

SAMPLE STATISTICS
MEAN = 359. S.D. = 133.9 C.S. = 1.8165 C.K. = 8.3905
SAMPLE STATISTICS (LOGS)
MEAN = 5.8045 S.D. = .3433 C.S. = .3213 C.K. = 3.5995
SAMPLE MIN = 149. SAMPLE MAX = 954. N = 61

PARAMETERS FOR GUMBEL I A = .3179E-02 U = 296.
PARAMETERS FOR LOGNORMAL M = 5.8045 S = .3433
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 53. M = 5.6277 S = .4279
STATISTICS OF LOG(X-A)
MEAN = 5.6277 S.D. = .4079 C.S. = .0784 C.K. = 3.4836
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8551 B = .3375E+02 LOG(M) = 3.6677
ME= .3916E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .8393 B = .7478E+32
LOG(M)= 2.9652 M = .1755E+02
DISTRIBUTION STATISTICS MEAN = 5.8045 S.D. = .3399 C.S. = .2313

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	139.		137.		147.		149.		152.	
1.050	191.		189.		192.		194.		195.	
1.250	251.		249.		247.		248.		248.	
2.000	331.		332.		328.		327.		326.	
2.330	351.	4.37	353.	4.43	349.	4.75	348.	4.74	346.	4.86
5.000	438.	4.97	443.	5.12	442.	5.34	440.	5.45	441.	5.57
10.000	508.	5.43	515.	5.93	519.	6.65	517.	6.60	520.	6.92
20.000	576.	5.93	584.	6.74	594.	8.08	593.	8.26	601.	8.62
50.000	664.	6.39	672.	7.75	693.	10.10	695.	10.98	713.	11.98
100.000	730.	6.69	737.	8.46	764.	11.78	775.	13.11	799.	14.48
200.000	796.	6.94	803.	9.13	845.	13.40	858.	15.40	891.	17.10
500.000	882.	7.21	892.	9.97	950.	15.50	973.	18.70	1022.	20.99

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1348.0

STURGEON RIVER AT MCDOUGALL MILLS 05QA004

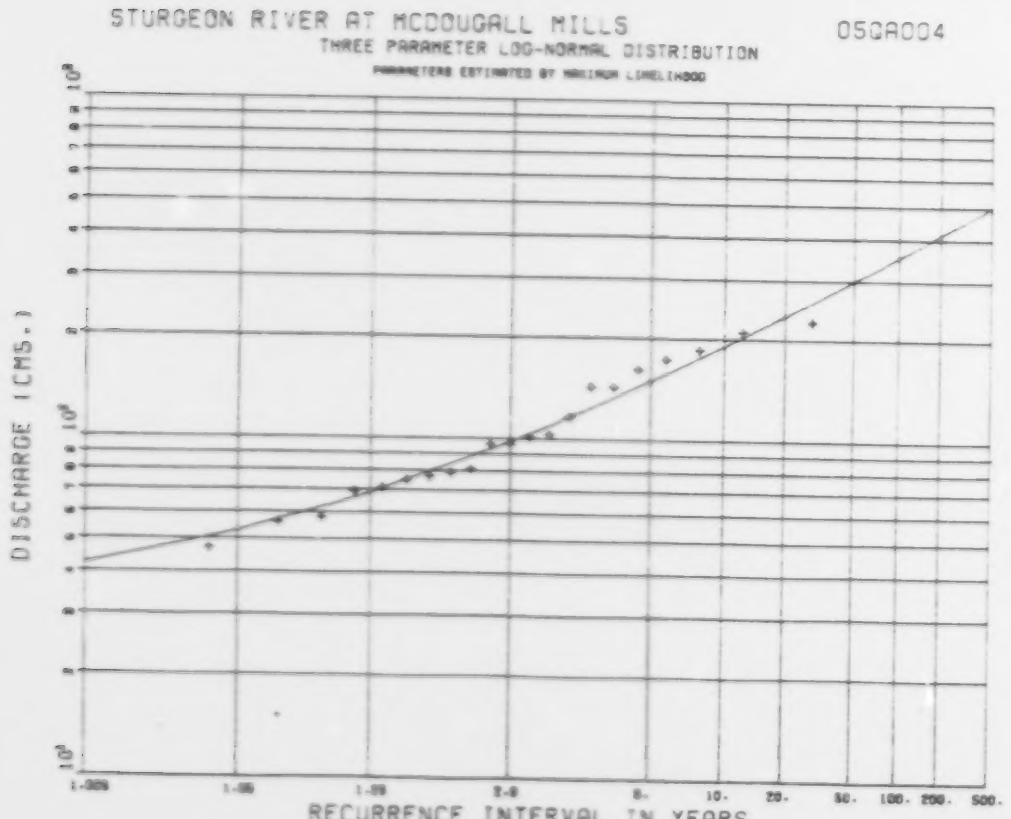
DRAINAGE AREA = 4451.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1962 - 1982

SAMPLE STATISTICS
MEAN = 113. S.D. = 52.9 C.S. = .8321 C.K. = 3.1371
SAMPLE STATISTICS (LOGS)
MEAN = 4.6266 S.D. = .4636 C.S. = .2113 C.K. = 2.5657
SAMPLE MIN = 47. SAMPLE MAX = 226. N = 21

PARAMETERS FOR GUMBEL I A = .0264451 U = 89.
PARAMETERS FOR LOGNORMAL M = 4.6266 S = .4638
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 30. M = 4.2072 S = .6750
STATISTICS OF LOG(X-A)
MEAN = 4.2072 S.D. = .6750 C.S. = -.1773 C.K. = 2.8806
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0480 B = .9315E+02 LOG(P) = .3401
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .1416E+01
A = .1343 B = .1138E+02
LOG(P)= 3.1192 M = .4252E+02
DISTRIBUTION STATISTICS MEAN = -.6254 S.D. = .5966 C.S. = .5342

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	28.		32.		47.		41.		35.	
1.050	47.		48.		61.		53.		51.	
1.250	71.		70.		83.		69.		69.	
2.000	103.		102.		114.		98.		99.	
5.000	152.	9.41	141.	9.96	150.	11.80	136.	10.60	140.	10.60
10.000	184.	10.20	169.	11.50	176.	13.70	165.	13.20	169.	12.80
20.000	214.	11.40	195.	13.30	200.	15.80	196.	17.60	196.	14.90
50.000	252.	13.40	232.	16.20	232.	19.10	229.	21.70	227.	18.70
100.000	281.	15.20	260.	18.60	256.	21.50	256.	25.30	252.	24.30
200.000	310.	17.20	289.	21.80	281.	24.40	284.	29.70	277.	30.10
500.000	349.	19.80	330.	26.50	314.	28.80	324.	36.70	311.	39.10
1000.000	382.	21.90	367.	30.50	342.	34.80	354.	40.50	339.	45.60
2000.000	416.	23.90	408.	34.80	373.	41.70	386.	44.70	369.	52.20
5000.000	462.	26.40	476.	40.50	417.	52.30	429.	49.60	411.	63.20
10000.000	497.	28.40	531.	45.00	452.	62.00	462.	53.40	444.	73.30
20000.000	532.	30.40	589.	49.60	488.	73.30	494.	57.30	477.	84.30
50000.000	577.	33.00	671.	56.20	537.	90.30	536.	62.60	521.	101.00
100000.000	611.	35.00	739.	61.50	577.	105.00	570.	66.70	556.	115.00
200000.000	645.	37.00	811.	66.90	618.	121.00	604.	70.80	591.	130.00
500000.000	690.	39.60	913.	74.00	675.	144.00	650.	76.30	638.	151.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I349.0

STURGEON RIVER AT OUTLET OF SALVESEN LAKE 05QE009

DRAINAGE AREA = 1538.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1965 - 1982

SAMPLE STATISTICS
MEAN = 44. S.D. = 18.3 C.S. = 1.7016 C.K. = 7.2679
SAMPLE STATISTICS (LOGS)
MEAN = 3.7891 S.D. = .3683 C.S. = .6840 C.K. = 3.9960
SAMPLE MIN = 25. SAMPLE MAX = 98. N = 18

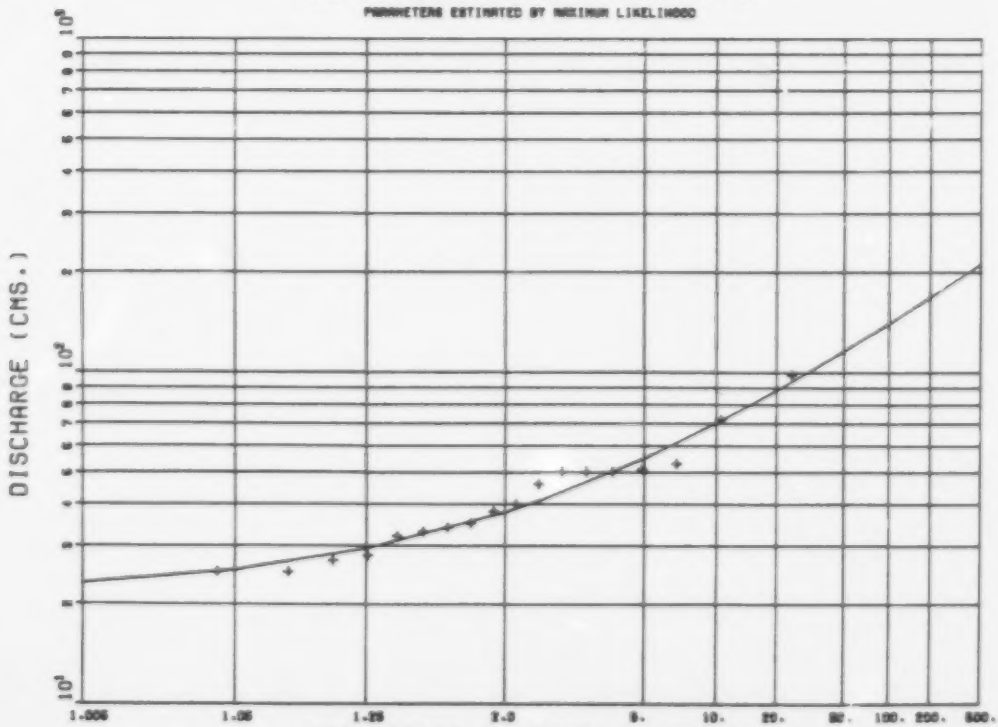
PARAMETERS FOR GUMBEL I A = .884724 U = 36.
PARAMETERS FOR LOGNORMAL P = 3.7891 S = .3683
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 21. M = 2.8006 S = .8496
STATISTICS OF LOG(X-A)
MEAN = 2.8006 S.D. = .8496 C.S. = -.2663 C.K. = 3.1490
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1259 B = .8549E+01 LOG(M) = 2.6324
ME= .1391E+02

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	17.		16.		23.		0.		20.	
1.050	23.		22.		25.		0.		24.	
1.250	31.		30.		32.		0.		30.	
2.000	41.		41.		38.		0.		39.	
2.330	43.	8.19	44.	8.75	40.	9.82	0.	0.00	42.	9.98
5.000	54.	9.29	56.	10.10	55.	14.30	0.	0.00	55.	11.90
10.000	63.	10.20	62.	11.30	70.	19.30	0.	0.00	67.	15.60
20.000	71.	11.00	75.	13.30	88.	24.70	0.	0.00	83.	20.90
50.000	82.	11.90	87.	15.30	116.	31.60	0.	0.00	99.	29.40
100.000	91.	12.40	96.	16.70	148.	37.00	0.	0.00	115.	36.60
200.000	99.	12.90	105.	18.00	184.	42.00	0.	0.00	131.	44.20
500.000	110.	13.40	118.	19.70	211.	48.40	0.	0.00	161.	55.20

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

STURGEON RIVER AT OUTLET OF SALVESEN LAKE 05QE009
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1350.0

STURGEON RIVER NEAR BARWICK 05PC010

DRAINAGE AREA 168.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1952 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	22.	12.	1.235	5.902
LN X SERIES	2.97	.56	-.638	4.561
X(MIN)= 4. CMS.		TOTAL SAMPLE SIZE= 32		
X(MAX)= 59. CMS.		NO. OF OUTLIERS= 1		

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	23.	12.	1.364	6.184
LN X SERIES	3.02	.49	-.115	3.492
LN (X-A) SERIES	3.08	.46	-.041	3.483

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -1.1038 M = 3.0820 S = .4682

FLOOD FREQUENCY REGIME

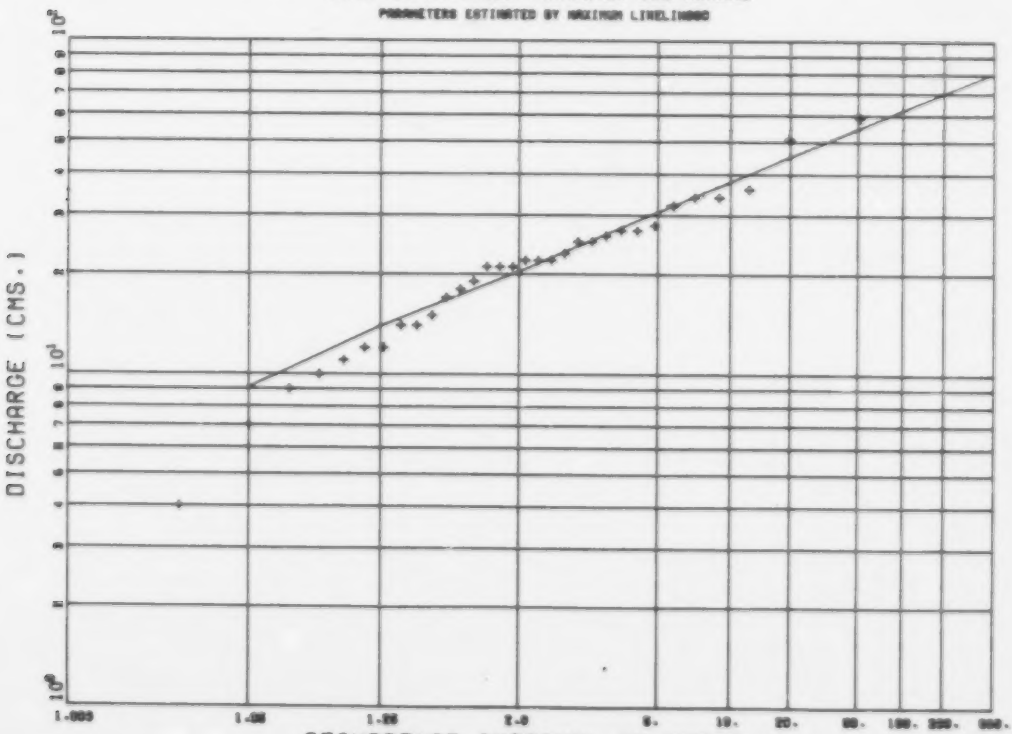
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	9.
1.250	.800	14.
2.000	.500	22.
2.330	.429	22.
5.000	.200	31.
10.000	.100	38.
20.000	.050	45.
50.000	.020	55.
100.000	.010	62.
200.000	.005	70.
500.000	.002	81.

STURGEON RIVER NEAR BARWICK 05PC010

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE 1351.0

STURGEON RIVER NEAR GLEN AFTON 02DC004

DRAINAGE AREA = 2980.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1942 - 1951

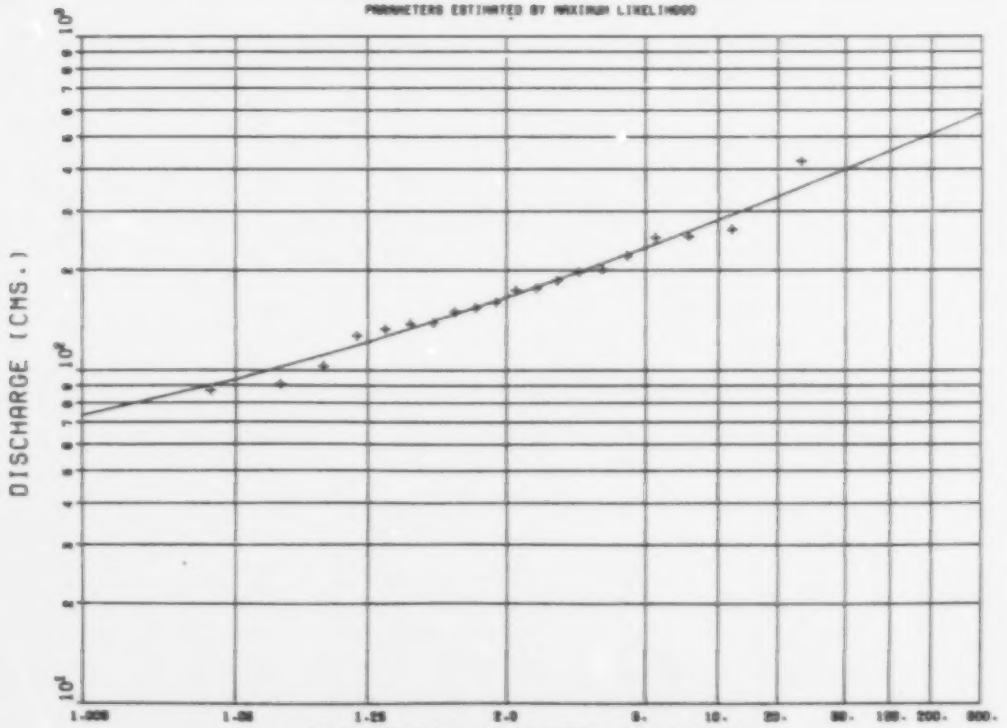
SAMPLE STATISTICS
MEAN = 181. S.D. = 76.4 C.S. = 1.6685 C.K. = 7.7507
SAMPLE STATISTICS (LOGS)
MEAN = 5.1269 S.D. = .3837 C.S. = .3368 C.K. = 4.0482
SAMPLE MIN = 87. SAMPLE MAX = 422. N = 20

PARAMETERS FOR GUMBEL I A = .019862 U = 149.
PARAMETERS FOR LOGNORMAL M = 5.1269 S = .3837
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 42. M = 4.8239 S = .5144
STATISTICS OF LOG(X-A)
MEAN = 4.8239 S.D. = .5144 C.S. = -.8375 C.K. = 3.8030
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0646 B = .3526E+02 LOG(P) = 2.8485
ME= .1726E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0645 B = .3370E+02
LOG(P)F= 2.9530 M = .1916E+02
DISTRIBUTION STATISTICS MEAN = 5.1269 S.D. = .3745 C.S. = .3445

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	62.		63.		73.		72.		7[illegible]	
1.[illegible]	91.		90.		94.		96.		93.	
[illegible]	124.		122.		12[illegible]		122.		12[illegible]	
[illegible]	169.		168.		166.		169.		16[illegible]	
[illegible]	18[illegible]	8.29	188.	8.65	177.	9.39	179.	9.10	177.	9.69
[illegible]	22[illegible]	9.27	233.	9.89	232.	11.10	229.	10.77	231.	10.90
10.000	266.	10.10	276.	11.60	281.	13.70	275.	13.30	279.	13.60
20.000	305.	10.90	317.	13.20	330.	16.80	323.	16.70	329.	17.40
50.000	35[illegible]	11.73	371.	15.10	398.	21.20	389.	22.20	396.	23.60
100.000	391.	12.10	411.	16.40	452.	24.20	442.	26.70	452.	28.60
200.000	427.	12.60	453.	17.80	504.	27.50	490.	31.40	511.	33.30
500.000	476.	13.40	509.	19.50	584.	32.30	561.	38.00	597.	41.30

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

STURGEON RIVER NEAR GLEN AFTON 02DC004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I352.0

SYDENHAM RIVER AT STRATHROY 02GG005

DRAINAGE AREA : 172.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

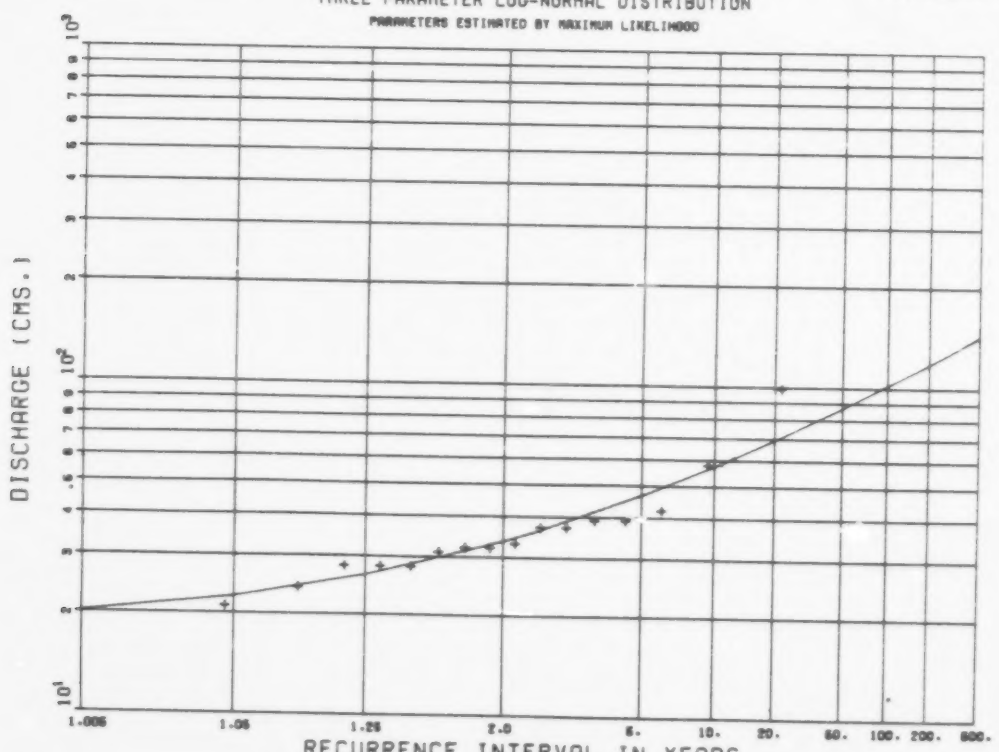
SAMPLE STATISTICS
MEAN = 30. S.D. = 18.4 C.S. = 2.7386 C.K. = 12.3426
SAMPLE STATISTICS (LOGS)
MEAN = 3.5640 S.D. = .3638 C.S. = 1.5621 C.K. = 7.3782
SAMPLE MIN = 21. SAMPLE MAX = 99. N = 16

PARAMETERS FOR GUMBEL I A = .107202 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5640 S = .3638
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 10. M = 2.7558 S = .7211
STATISTICS OF LOG(X-A)
MEAN = 2.7558 S.D. = .7211 C.S. = .1702 C.K. = 5.3423
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2841 B = .1639E+01 LOG(M) = 3.0982
ME= .2216E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1748 B = .3783E+01
LOG(M)= 2.9027 M = .1822E+02
DISTRIBUTION STATISTICS MEAN = 3.5640 S.D. = .3400 C.S. = 1.0283

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	16.		14.		20.		20.		.	
1.050	21.		19.		22.		23.		0.	
1.250	27.		26.		26.		27.		0.	
2.003	35.		35.		33.		33.		0.	
2.330	37.	8.00	38.	9.17	36.	9.47	35.	8.81	0.	0.00
5.000	46.	9.22	48.	10.60	47.	13.00	46.	12.30	0.	0.00
10.000	53.	10.30	56.	12.30	57.	17.30	56.	16.50	0.	0.00
20.000	59.	11.10	64.	13.90	69.	22.10	67.	21.40	0.	0.00
50.000	68.	12.10	75.	16.00	87.	28.50	84.	28.40	0.	0.00
100.000	75.	12.70	82.	17.50	102.	33.40	100.	34.20	0.	0.00
200.000	81.	13.20	90.	18.90	119.	38.10	117.	39.80	0.	0.00
500.000	90.	13.70	101.	20.60	143.	44.20	145.	47.90	0.	0.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SYDENHAM RIVER AT STRATHROY 02GG005
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I353.0
I-369

SYDENHAM RIVER NEAR ALVINSTON 02GG002

DRAINAGE AREA : 730.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1949 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	119.	47.	.939	4.691
LN X SERIES	4.70	.41	-.596	4.798

X(MIN)= 35. CMS. TOTAL SAMPLE SIZE= 34
X(MAX)= 238. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

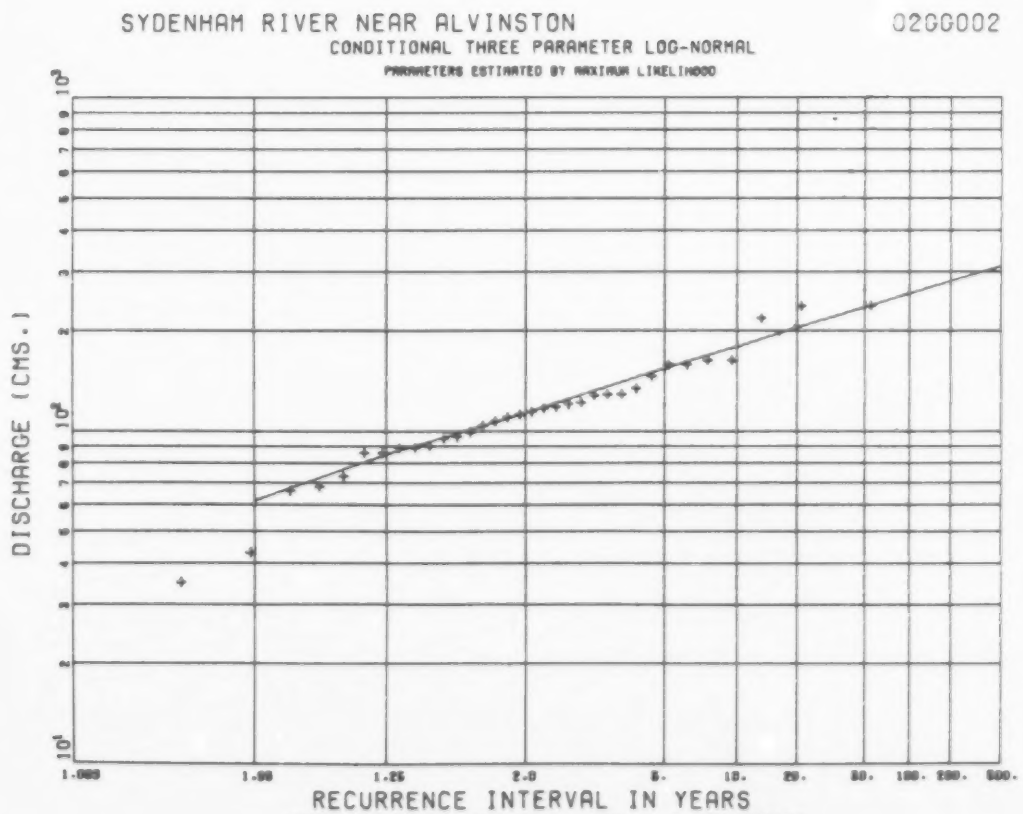
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	121.	45.	1.113	4.870
LN X SERIES	4.73	.36	-.114	4.308
LN (X-A) SERIES	4.85	.33	.052	4.133

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -12.8801 M = 4.8480 S = .3251

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.005	.997	-
1.050	.952	62.
1.250	.800	85.
2.000	.500	113.
5.130	.429	121.
5.000	.200	154.
10.000	.100	179.
20.000	.050	204.
50.000	.020	235.
100.000	.010	258.
200.000	.005	281.
500.000	.002	311.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1354.0

SYDENHAM RIVER NEAR DRESDEN 02GG007

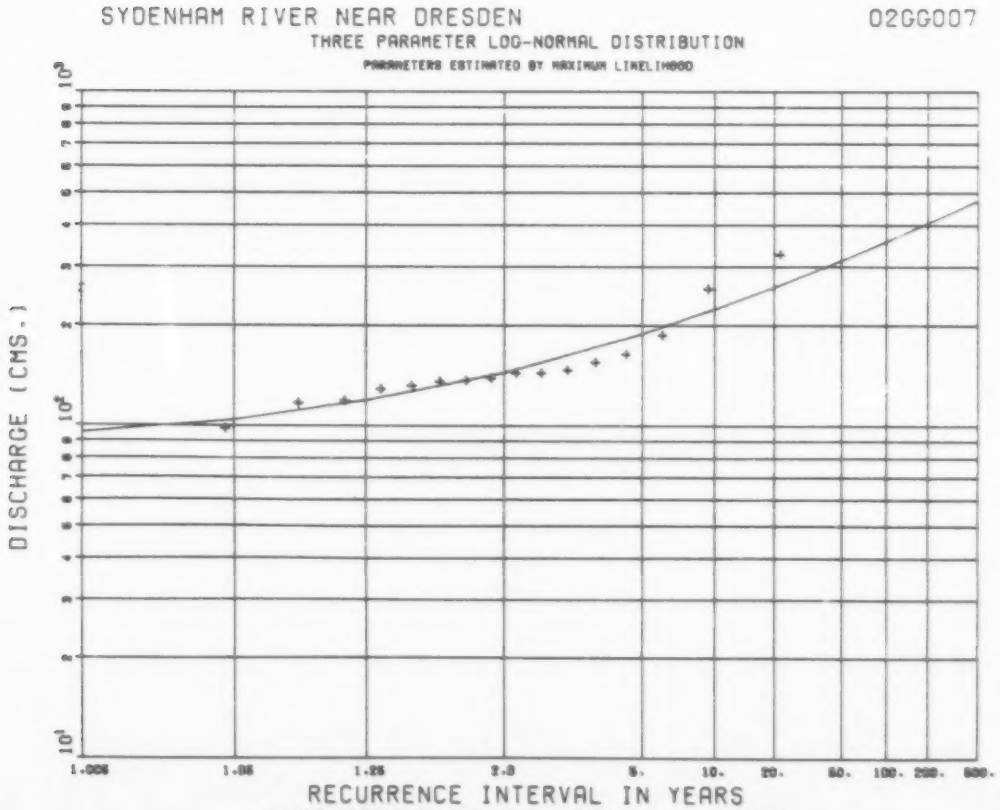
DRAINAGE AREA = 1248.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1967 - 1982

SAMPLE STATISTICS
MEAN = 156. S.D. = 57.2 C.S. = 2.1565 C.K. = 8.4881
SAMPLE STATISTICS (LOGS)
MEAN = 5.0173 S.D. = .2958 C.S. = 1.4617 C.K. = 6.2023
SAMPLE MIN = 98. SAMPLE MAX = 326. N = 16

PARAMETERS FOR GUMBEL I A = .831742 U = 137.
PARAMETERS FOR LOGNORMAL M = 5.0173 S = .2958
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 83. M = 4.1124 S = .6438
STATISTICS OF LOG(X-A)
MEAN = 4.1124 S.D. = .6438 C.S. = .1935 C.K. = 5.3265
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2162 B = .1472E+01 LOG(M) = 4.6126
ME= .1007E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1358 B = .4083E+01
LOG(M)= 4.4626 M = .8671E+02
DISTRIBUTION STATISTICS MEAN = 5.0173 S.D. = .2745 C.S. = .9898

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	84.		71.		95.		95.		0.	
1.050	102.		93.		104.		105.		0.	
1.250	122.		118.		119.		120.		0.	
2.000	140.		151.		144.		144.		0.	
2.330	155.	6.44	164.	7.45	152.	7.62	152.	7.14	0.	0.00
5.000	184.	7.71	194.	8.61	188.	10.50	186.	9.88	0.	0.00
10.000	208.	8.77	221.	9.98	223.	14.00	218.	13.20	0.	0.00
20.000	230.	9.67	246.	11.30	259.	18.00	252.	17.10	0.	0.00
50.000	260.	10.70	277.	13.00	312.	23.70	303.	22.90	0.	0.00
100.000	282.	11.30	300.	14.20	356.	28.10	346.	27.20	0.	0.00
200.000	304.	11.90	324.	15.40	404.	32.40	394.	31.90	0.	0.00
500.000	333.	12.60	354.	16.80	473.	38.10	467.	38.40	0.	0.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1955.0

SYDENHAM RIVER NEAR OWEN SOUND 02FB007

DRAINAGE AREA = 181.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1946 - 1982

SAMPLE STATISTICS
MEAN = 39. S.D. = 18.3 C.S. = 1.2036 C.K. = 5.4063
SAMPLE STATISTICS (LOGS)
MEAN = 3.5627 S.D. = .4657 C.S. = -.2267 C.K. = 3.6175
SAMPLE MIN = 11. SAMPLE MAX = 99. N = 37

PARAMETERS FOR GUMBEL I A = .073385 U = 31.
PARAMETERS FOR LOGNORMAL M = 3.5627 S = .4657
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -6. M = 3.7237 S = .3949
STATISTICS OF LOG(X-A)
MEAN = 3.7237 S.D. = .3949 C.S. = -.0034 C.K. = 3.4182
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8528 B = .7784E+02 LOG(M) = 7.6713
ME= .2146E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0474 B = .9398E+02
LOG(M)= 8.0151 M = .3026E+04
DISTRIBUTION STATISTICS MEAN = 3.5627 S.D. = .4593 C.S. = -.2063

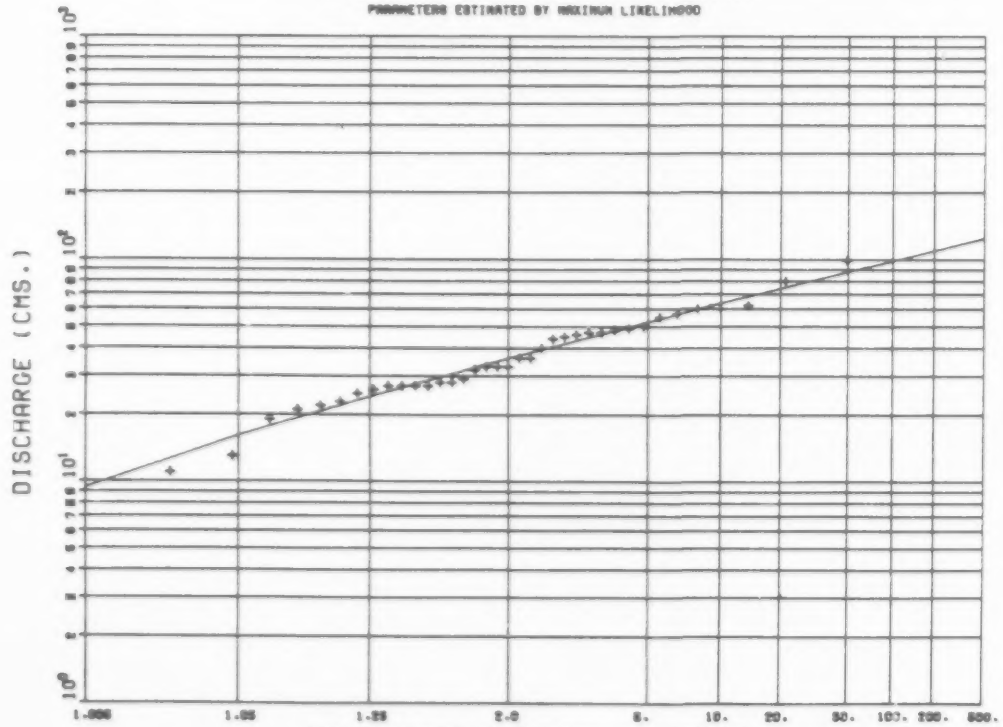
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	8.		11.		9.		10.		10.	
1.053	16.		16.		16.		16.		16.	
1.250	25.		24.		24.		24.		24.	
2.000	36.		35.		36.		36.		36.	
2.330	39.	7.31	38.	7.72	39.	7.91	39.	8.07	39.	8.23
5.000	52.	7.85	52.	8.91	52.	8.37	52.	8.14	52.	8.41
10.000	62.	8.40	64.	10.30	61.	9.81	63.	9.41	63.	9.47
20.000	72.	8.97	76.	11.70	74.	11.70	73.	11.20	74.	11.40
50.000	84.	9.76	92.	13.50	90.	14.40	86.	14.40	87.	14.60
100.000	94.	9.67	104.	14.78	98.	16.68	96.	17.20	96.	17.78
200.000	103.	9.92	117.	15.98	109.	18.78	105.	20.10	106.	20.90
500.000	116.	18.20	135.	17.40	124.	21.48	118.	24.20	119.	25.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

SYDENHAM RIVER NEAR OWEN SOUND 02FB007

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1356.0

TEESWATER RIVER NEAR PAISLEY 02FC015

DRAINAGE AREA = 663.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1972 - 1982

SAMPLE STATISTICS
MEAN = 103. S.D. = 26.7 C.S. = .2474 C.K. = 2.4860
SAMPLE STATISTICS (LOGS)
MEAN = 4.6029 S.D. = .2612 C.S. = .0581 C.K. = 2.3913
SAMPLE MIN = 70. SAMPLE MAX = 142. N = 11

PARAMETERS FOR GUMBEL I A = .047614 U = 91.
PARAMETERS FOR LOGNORMAL M = 4.6029 S = .2612
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 62. M = 3.4532 S = .8006
STATISTICS OF LOG(X-A)
MEAN = 3.4532 S.D. = .8006 C.S. = -.4020 C.K. = 2.9248
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8076 B = .1183E+04 LOG(M) = 4.3820
ME= .1250E-01

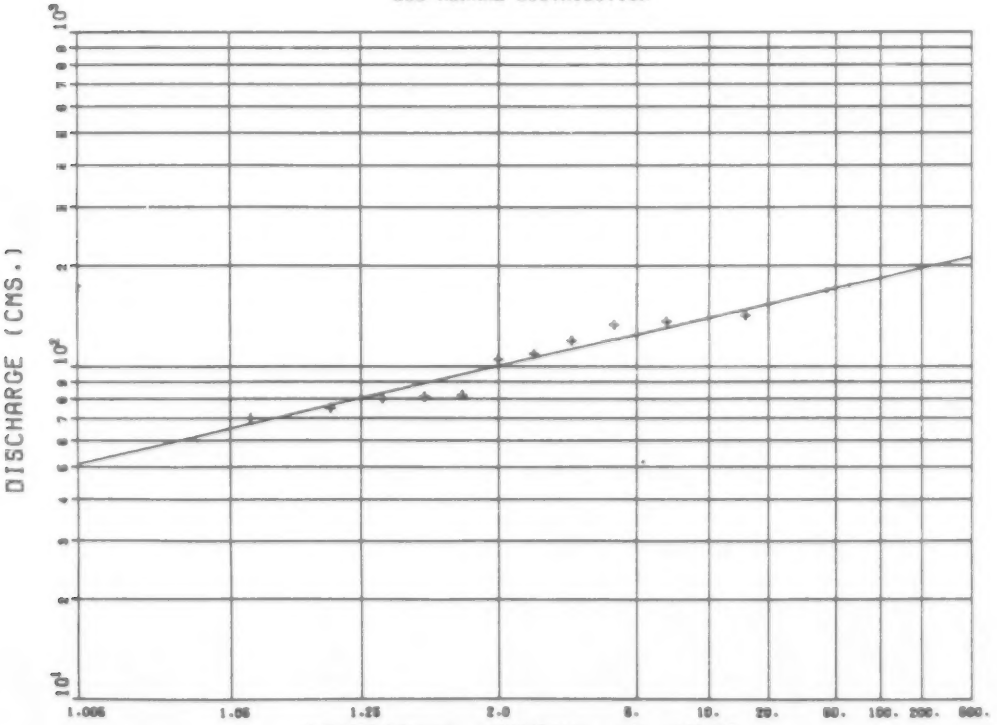
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	56.		51.		66.		0.		52.	
1.050	67.		65.		71.		0.		65.	
1.250	81.		80.		78.		0.		80.	
2.000	98.		100.		94.		0.		100.	
2.330	103.	7.82	105.	7.94	99.	9.26	0.	0.00	104.	8.55
5.000	122.	9.35	124.	9.17	124.	14.80	0.	0.00	124.	9.36
10.000	138.	10.60	139.	10.60	150.	19.60	0.	0.00	140.	11.10
20.000	153.	11.70	153.	12.10	180.	25.80	0.	0.00	154.	13.70
50.000	173.	12.90	171.	13.90	226.	34.30	0.	0.00	172.	16.00
100.000	187.	13.70	183.	15.20	266.	40.70	0.	0.00	185.	17.60
200.000	202.	14.30	196.	16.40	311.	47.00	0.	0.00	198.	19.40
500.000	221.	15.10	212.	17.90	379.	55.00	0.	0.00	216.	20.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

TEESWATER RIVER NEAR PAISLEY 02FC015

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I357.0

TEMAGAMI RIVER AT CROSS LAKE DAM 02DC007

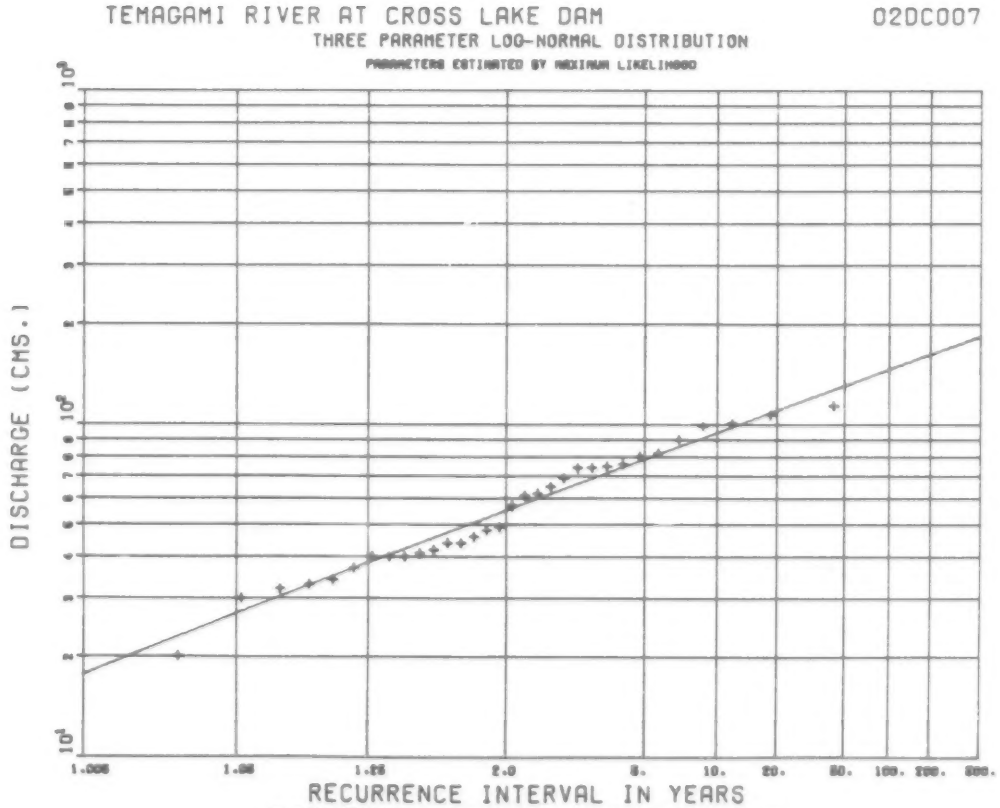
DRAINAGE AREA : 1360.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1941 - 1972

SAMPLE STATISTICS
MEAN = 60. S.D. = 24.9 C.S. = .5840 C.K. = 2.7158
SAMPLE STATISTICS (LOGS)
MEAN = 4.0009 S.D. = .4278 C.S. = -.1350 C.K. = 2.7277
SAMPLE MIN = 20. SAMPLE MAX = 114. N = 32

PARAMETERS FOR GUMBEL I A = .051171 U = 48.
PARAMETERS FOR LOGNORMAL M = 4.0009 S = .4278
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -2. M = 4.0456 S = .4090
STATISTICS OF LOG(X-A)
MEAN = 4.0456 S.D. = .4090 C.S. = -.0947 C.K. = 2.6664
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0289 B = .2194E+03 LOG(P) =10.3370
ME= .3085E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0700 B = .3665E+02
LOG(M)= 6.5648 M = .7096E+03
DISTRIBUTION STATISTICS MEAN = 4.0009 S.D. = .35 C.S. = -.3304

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	16.		18.		18.		16.		17.	
1.050	26.		27.		27.		26.		27.	
1.250	39.		38.		38.		39.		38.	
2.000	55.		55.		55.		56.		55.	
2.330	59.	7.38	59.	7.62	59.	7.99	60.	7.91	60.	8.15
5.000	77.	8.04	78.	8.80	78.	8.66	78.	7.96	79.	8.53
10.000	92.	8.68	95.	10.20	94.	10.30	92.	8.75	94.	9.77
20.000	106.	9.21	110.	11.60	110.	12.30	105.	10.20	109.	11.80
50.000	124.	9.77	132.	13.30	130.	15.30	121.	13.00	128.	15.30
100.000	138.	10.10	148.	14.60	146.	17.70	132.	15.40	142.	18.40
200.000	152.	10.40	164.	15.70	162.	20.00	143.	18.00	156.	21.60
500.000	170.	10.70	187.	17.20	183.	23.00	157.	21.50	175.	26.10

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I350.0

TEMAGAMI RIVER AT RED CEDAR LAKE DAM 02DC008

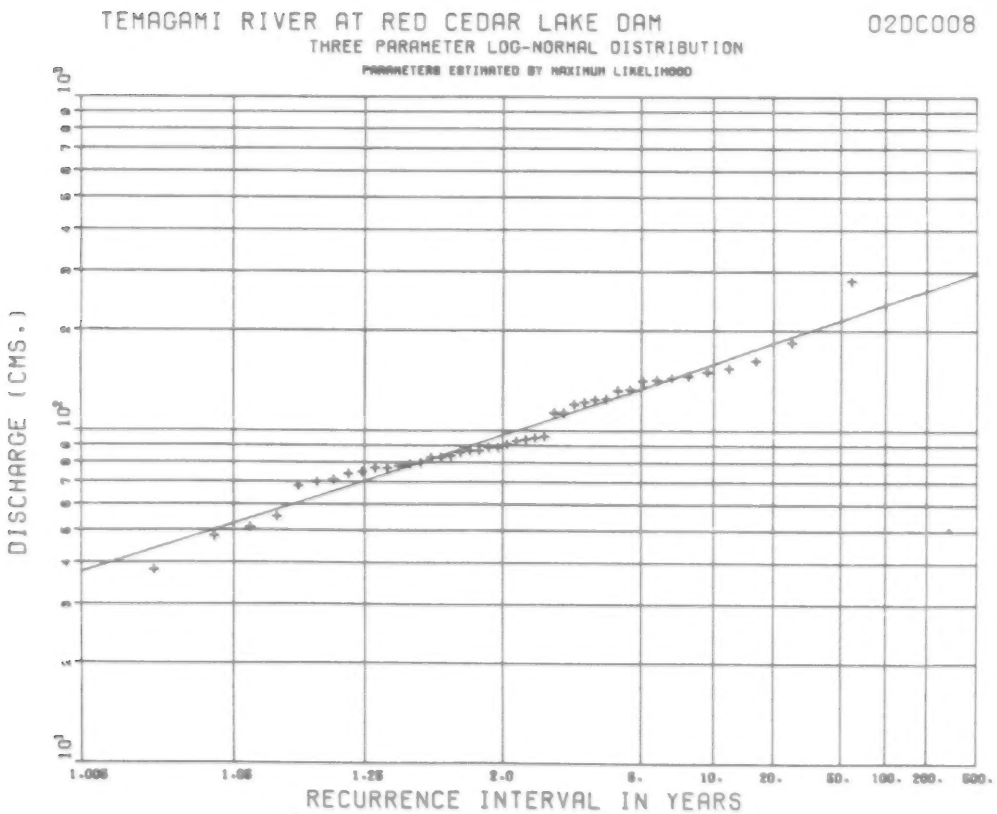
DRAINAGE AREA : 2360.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1939 - 1982

SAMPLE STATISTICS
MEAN = 104. S.D. = 43.1 C.S. = 1.7614 C.K. = 8.7053
SAMPLE STATISTICS (LOGS)
MEAN = 4.5739 S.D. = .3806 C.S. = .1479 C.K. = 3.9423
SAMPLE MIN = 38. SAMPLE MAX = 282. N = 44.

PARAMETERS FOR GUMBEL I A = .032629 U = 86.
PARAMETERS FOR LOGNORMAL M = 4.5739 S = .3806
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 4.5171 S = .4026
STATISTICS OF LOG(X-A)
MEAN = 4.5171 S.D. = .4026 C.S. = .0654 C.K. = 3.9500
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0281 B = .1830E+03 LOG(M) = -.5740
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .5633E+00
A = .0198 B = .3607E+03
LOG(M)= -2.5697 M = .7656E-01
DISTRIBUTION STATISTICS MEAN = 4.5739 S.D. = .3761 C.S. = .1053

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	35.		36.		37.		38.		38.	
1.060	52.		52.		52.		53.		53.	
1.250	71.		70.		70.		71.		70.	
2.000	97.		97.		96.		96.		96.	
2.330	104.	5.65	104.	5.78	103.	6.15	103.	6.16	103.	6.26
5.000	132.	6.31	134.	6.96	133.	6.80	133.	6.82	133.	6.97
10.000	155.	6.89	158.	7.74	158.	8.16	158.	8.16	159.	8.42
20.000	177.	7.38	181.	8.80	183.	9.88	182.	10.10	184.	10.50
50.000	206.	7.90	212.	10.10	214.	12.40	214.	13.30	218.	13.90
100.000	227.	8.23	235.	11.00	239.	14.30	239.	15.90	245.	16.70
200.000	248.	8.50	258.	11.90	263.	16.20	265.	18.80	272.	19.70
500.000	276.	8.81	290.	13.00	297.	18.80	301.	22.70	311.	23.90

F.E.= FLOOD ESTIPATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I359.0

TEMAGAMI RIVER NEAR RIVER VALLEY 02DC005

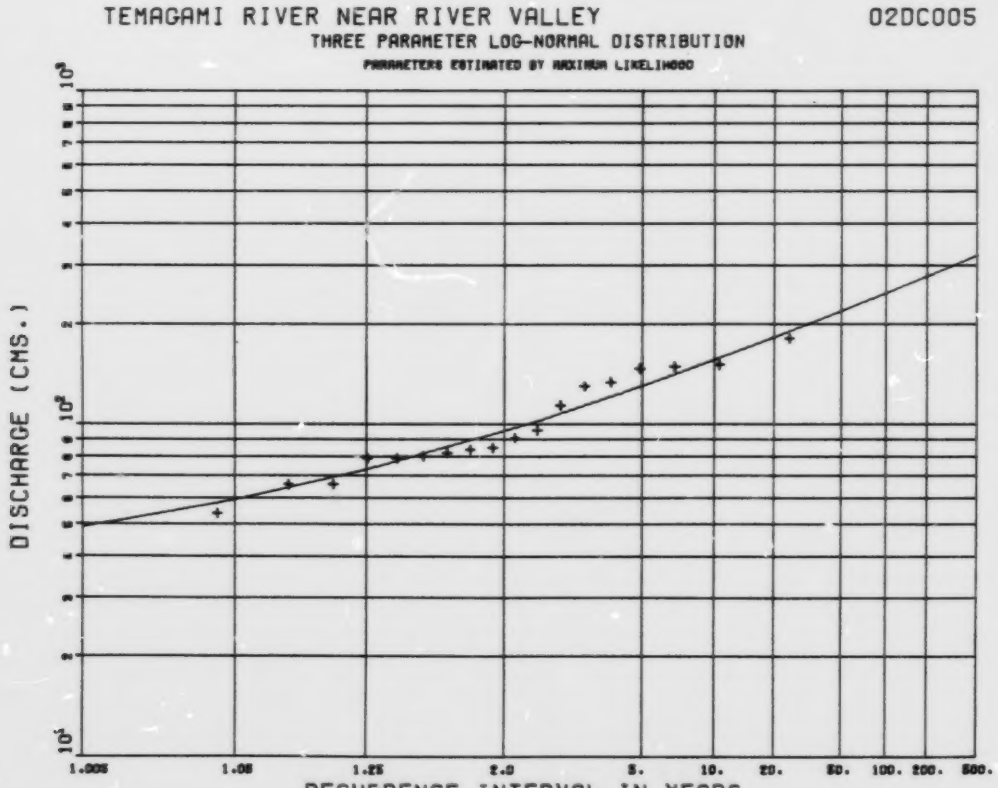
DRAINAGE AREA : 2460.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1945 - 1962

SAMPLE STATISTICS
MEAN = 104. S.D. = 36.3 C.S. = .6698 C.K. = 2.9672
SAMPLE STATISTICS (LOGS)
MEAN = 4.5865 S.D. = .3419 C.S. = .2044 C.K. = 2.6571
SAMPLE MIN = 54. SAMPLE MAX = 181. N = 18

PARAMETERS FOR GUMBEL I A = .036768 U = 87.
PARAMETERS FOR LOGNORMAL P = 4.5865 S = .3419
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 33. M = 4.1351 S = .5292
STATISTICS OF LOG(X-A)
MEAN = 4.1351 S.D. = .5292 C.S. = -.1331 C.K. = 3.0063
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0349 B = .9570E+02 LOG(M) = 1.2402
ME= .3456E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0891 B = .1430E+02
LOG(M)F= 3.3121 M = .2744E+02
DISTRIBUTION STATISTICS MEAN = 4.5865 S.D. = .3370 C.S. = .5288

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	42.		41.		49.		49.		43.	
1.050	57.		56.		59.		60.		57.	
1.250	75.		74.		73.		74.		73.	
2.000	97.		98.		95.		95.		97.	
2.330	103.	7.89	104.	8.12	101.	8.91	101.	8.58	103.	8.82
5.000	128.	9.01	131.	9.38	130.	10.90	129.	10.50	132.	9.93
10.000	149.	9.97	152.	10.90	156.	13.70	153.	13.40	153.	12.10
20.000	168.	10.80	172.	12.40	182.	17.00	179.	17.10	176.	15.20
50.000	194.	11.70	198.	14.20	218.	21.70	215.	22.70	206.	20.20
100.000	213.	12.20	217.	15.50	247.	25.30	244.	27.30	229.	24.40
200.000	231.	12.70	237.	16.70	277.	28.90	276.	32.20	253.	28.80
500.000	256.	13.20	263.	18.30	320.	33.50	323.	38.90	286.	35.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1 I360.0

THAMES RIVER AT BYRON 02GE002

DRAINAGE AREA : 3110.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1915 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	839.	226.	-.460	3.131
LN X SERIES	6.38	.46	-1.432	5.510

X(MIN)= 151. CMS. TOTAL SAMPLE SIZE= 28
X(MAX)= 977. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

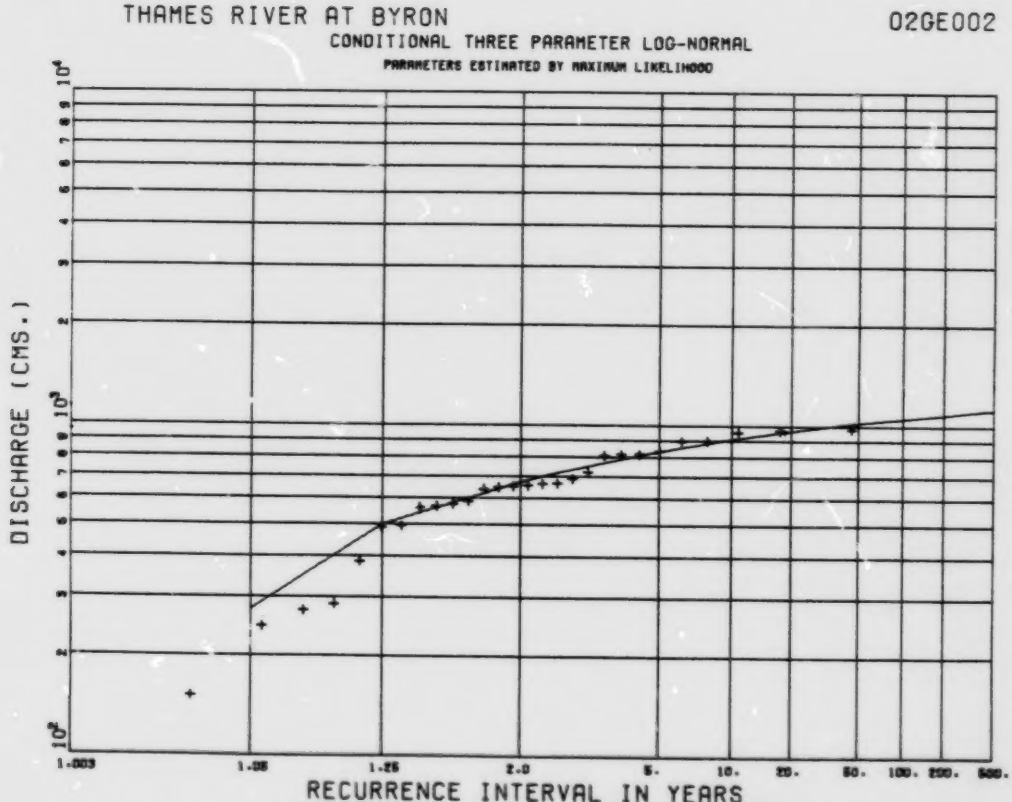
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	857.	208.	-.385	3.083
LN X SERIES	6.43	.38	-1.143	4.418
LN (X-A) SERIES	6.89	.21	-.056	2.859

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 1661.3055 M = 6.8910 S = .2881

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.053	.952	275.
1.250	.800	496.
2.000	.500	668.
5.000	.429	706.
5.000	.200	831.
10.000	.100	905.
20.000	.050	960.
50.000	.020	1020.
100.000	.010	1050.
200.000	.005	1080.
500.000	.002	1120.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I341.0

THAMES RIVER AT INGERSOLL 02CD016

DRAINAGE AREA : 518.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1957 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	79.	41.	1.110	5.043
LN X SERIES	4.24	.54	-.474	4.256

X(MIN)= 18. CMS. TOTAL SAMPLE SIZE= 26
X(MAX)= 194. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

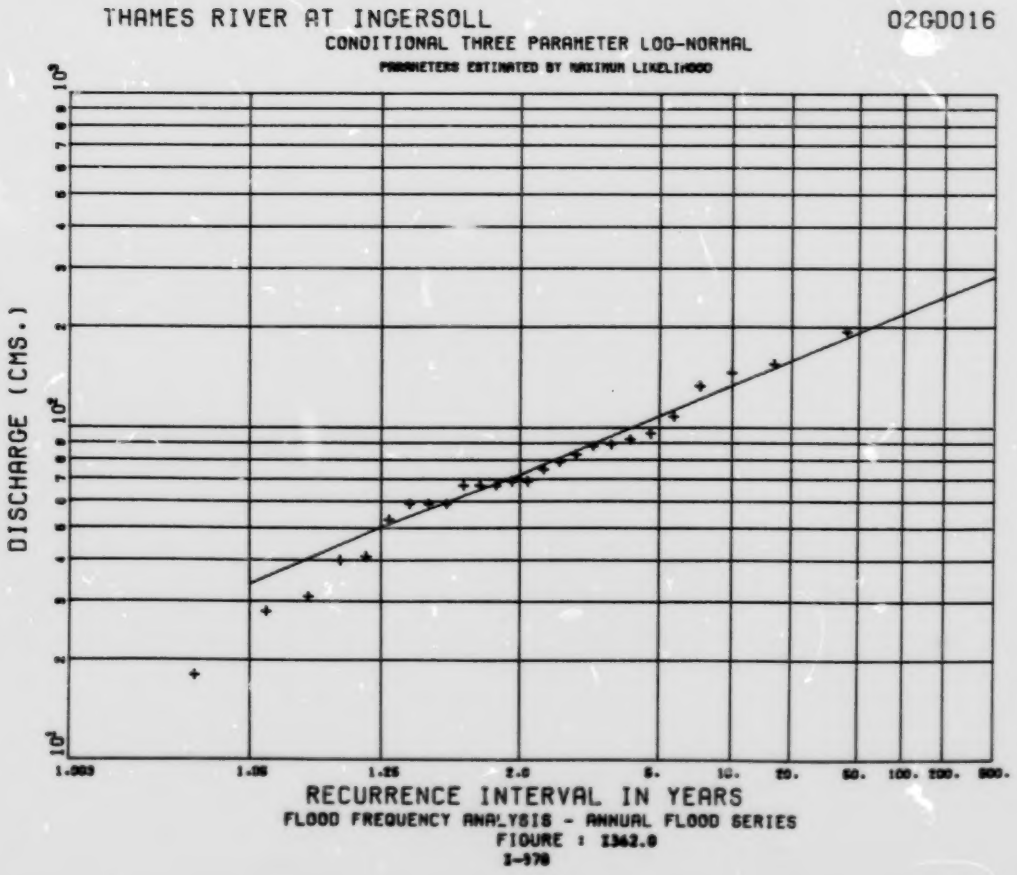
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	82.	40.	1.229	5.237
LN X SERIES	4.30	.47	-.044	3.711
LN (X-A) SERIES	4.31	.47	-.030	3.706

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -.7185 M = 4.3100 S = .4672

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	34.
1.250	.800	50.
2.000	.500	72.
2.330	.429	79.
5.000	.200	108.
10.000	.100	133.
20.000	.050	158.
50.000	.020	192.
100.000	.010	219.
200.000	.005	246.
500.000	.002	283.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I362.0
I-378

THAMES RIVER AT THAMESVILLE 02GE003

DRAINAGE AREA : 4300.0 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1955 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	543.	192.	-.051	3.249
LN X SERIES	6.22	.42	-1.049	4.938

X(MIN)= 152. CMS. TOTAL SAMPLE SIZE= 29
X(MAX)= 960. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

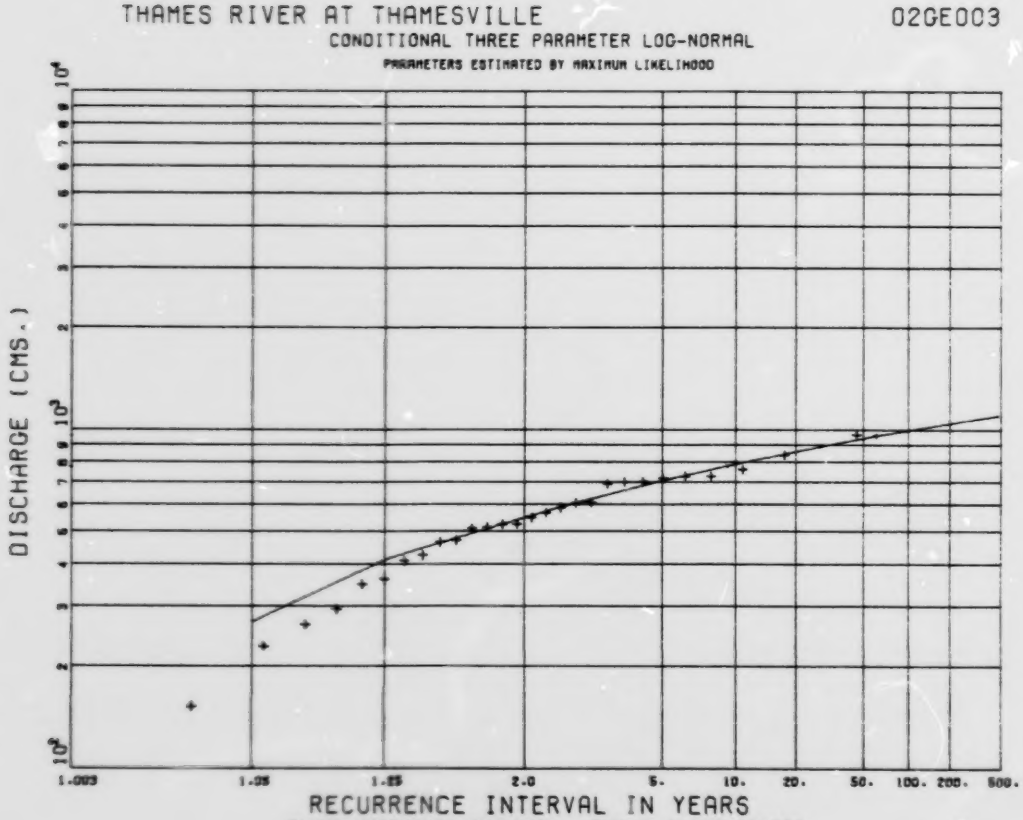
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	557.	179.	.173	3.333
LN X SERIES	6.27	.35	-.643	3.520
LN (X-A) SERIES	8.23	.05	-.009	3.163

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -3206.3299 M = 8.2321 S = .0476

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	259.
1.250	.800	410.
2.000	.500	545.
2.330	.429	573.
5.000	.200	732.
10.000	.100	786.
20.000	.050	856.
50.000	.020	937.
100.000	.010	991.
200.000	.005	1040.
500.000	.002	1100.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I363.0

THAMES RIVER AT WOODSTOCK (1952-64) 02GD012

DRAINAGE AREA : 254.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1952 - 1964

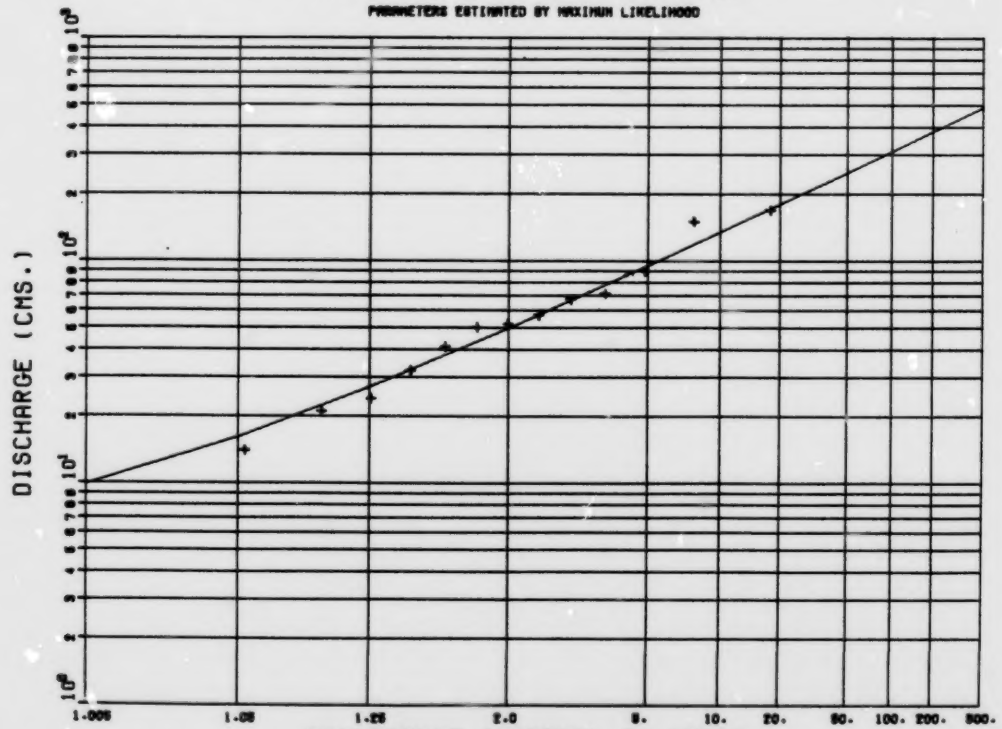
SAMPLE STATISTICS
MEAN = 64. S.D. = 47.5 C.S. = 1.3483 C.K. = 5.0932
SAMPLE STATISTICS (LOGS)
MEAN = 3.9273 S.D. = .7389 C.S. = -.0241 C.K. = 3.5366
SAMPLE MIN = 14. SAMPLE MAX = 169. N = 13

PARAMETERS FOR GUMBEL I A = .032544 U = 45.
PARAMETERS FOR LOGNORMAL M = 3.9273 S = .7389
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 4. M = 3.8850 S = .8234
STATISTICS OF LOG(X-A)
MEAN = 3.8050 S.D. = .8234 C.S. = -.2142 C.K. = 3.6639
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0888 B = .6859E+04 LOG(M) =64.4569
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .9847E+28
A = -.0154 B = .2098E+04
LOG(M)F=36.0354 M = .4466E+16
DISTRIBUTION STATISTICS MEAN = 3.9273 S.D. = .7823 C.S. = -.0437

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	-6.		8.		10.		8.		8.	
1.050	11.		15.		16.		16.		15.	
1.250	30.		27.		27.		28.		28.	
2.000	56.		51.		49.		51.		51.	
2.330	63.	17.30	58.	20.40	57.	21.80	58.	21.00	58.	21.90
5.000	91.	16.90	94.	23.60	94.	25.40	92.	22.50	94.	23.60
10.000	114.	17.30	130.	27.40	134.	30.60	124.	26.30	129.	27.60
20.000	136.	17.70	169.	31.10	179.	36.30	160.	32.00	168.	33.70
50.000	162.	18.20	226.	35.70	248.	43.80	211.	41.70	226.	43.90
100.000	186.	18.50	278.	39.80	309.	49.30	254.	49.90	274.	52.60
200.000	208.	18.80	334.	42.10	379.	54.60	301.	58.60	328.	61.90
500.000	236.	19.10	417.	46.80	486.	61.20	370.	70.80	408.	74.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

THAMES RIVER AT WOODSTOCK (1952-64) 02GD012
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1364.0
E-380

THAMES RIVER NEAR DUTTON 02GE006

DRAINAGE AREA : 3760.0 SQ. KM.
REGULATED FLOW : 1 CLASS 2
PERIOD OF RECORD : 1973 - 1982

SAMPLE STATISTICS
MEAN = 576. S.D. = 141.9 C.S. = 2.2097 C.K. = 9.6967
SAMPLE STATISTICS (LOGS)
MEAN = 6.3336 S.D. = .2110 C.S. = 1.8133 C.K. = 7.9905
SAMPLE MIN = 464. SAMPLE MAX = 940. N = 10

PARAMETERS FOR GUMBEL I A = .013426 U = 524.
PARAMETERS FOR LOGNORMAL M = 6.3336 S = .2110
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 458. M = 4.1530 S = 1.2627
STATISTICS OF LOG(X-A)
MEAN = 4.1530 S.D. = 1.2627 C.S. = -.3569 C.K. = 4.5612
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1914 B = .1216E+01 LOG(P) = 6.1909
ME= .4463E+03

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

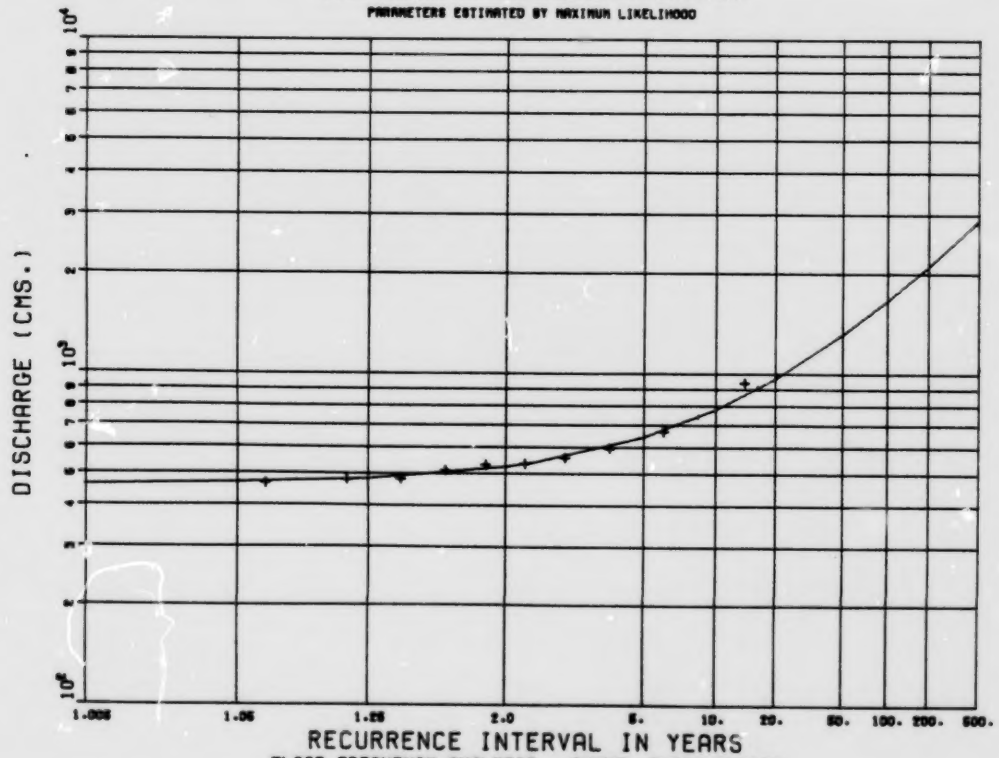
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	399.		327.		460.		0.		446.	
1.050	441.		398.		466.		0.		454.	
1.250	488.		474.		480.		0.		476.	
2.000	551.		563.		522.		0.		531.	
2.330	567.	5.27	585.	6.73	538.	6.02	0.	0.00	549.	10.10
5.000	635.	6.68	673.	7.77	642.	13.40	0.	0.00	644.	12.30
10.000	691.	7.68	738.	9.01	779.	22.60	0.	0.00	741.	15.80
20.000	745.	8.94	797.	10.20	966.	33.20	0.	0.00	852.	23.50
50.000	814.	10.20	869.	11.80	1310.	48.00	0.	0.00	1030.	33.80
100.000	866.	11.00	920.	12.80	1660.	58.90	0.	0.00	1180.	52.90
200.000	918.	11.70	970.	13.90	2100.	69.30	0.	0.00	1360.	66.70
500.000	986.	12.60	1030.	15.10	2870.	82.00	0.	0.00	1660.	91.70

F.E. = FLOOD ESTIMATE (CMS)
S.E.P. = STANDARD ERROR PERCENT

THAMES RIVER NEAR DUTTON 02GE006

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1365.0

THAMES RIVER NEAR EALING 02GD001

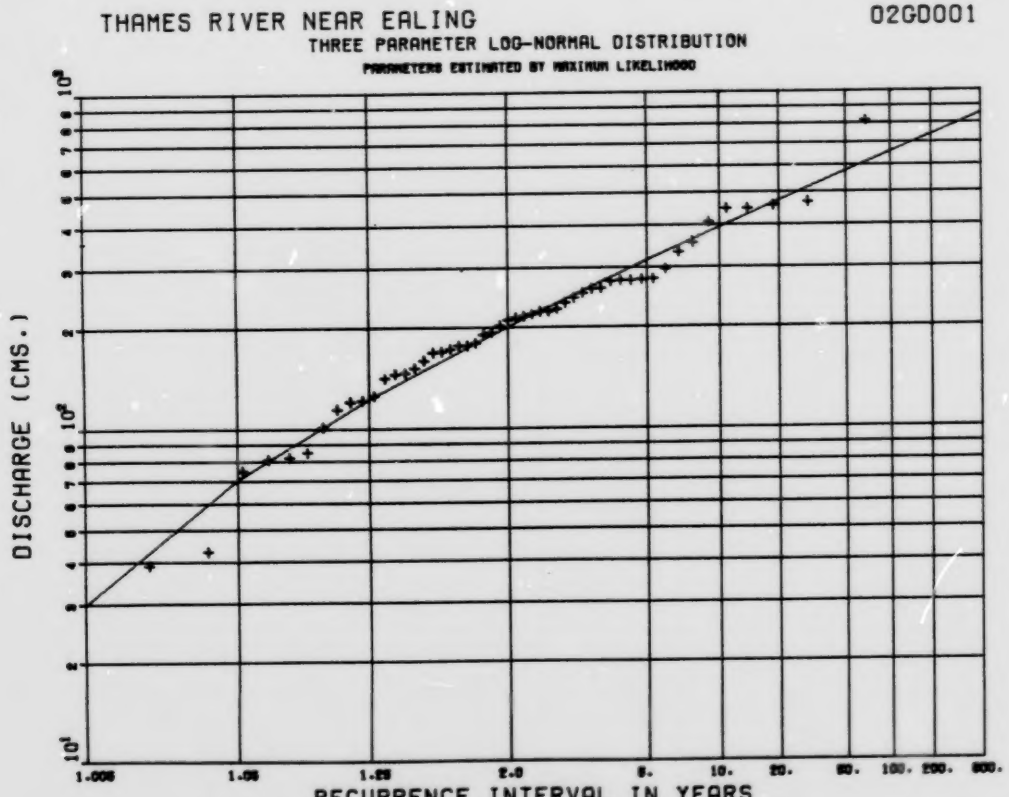
DRAINAGE AREA : 1340.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1916 - 1966

SAMPLE STATISTICS
MEAN = 226. S.D. = 134.0 C.S. = 1.9496 C.K. = 9.5386
SAMPLE STATISTICS (LOGS)
MEAN = 5.2630 S.D. = .5847 C.S. = -.4476 C.K. = 4.1461
SAMPLE MIN = 39. SAMPLE MAX = 813. N = 51

PARAMETERS FOR GUMBEL I A = .010828 U = 170.
PARAMETERS FOR LOGNORMAL M = 5.2630 S = .5847
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -49. M = 5.5178 S = .4461
STATISTICS OF LOG(X-A)
MEAN = 5.5178 S.D. = .4461 C.S. = .0499 C.K. = 3.8010
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1309 B = .1996E+02 LOG(M) = 7.8757
ME= .2633E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0835 B = .4773E+02
LOG(M)F= 9.2481 M = .1038E+05
DISTRIBUTION STATISTICS MEAN = 5.2630 S.D. = .5768 C.S. = -.2895

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	16.		43.		30.		37.		34.	
1.050	68.		74.		71.		72.		69.	
1.250	127.		118.		122.		120.		121.	
2.000	204.		193.		200.		199.		202.	
2.330	224.	7.33	214.	8.25	221.	8.10	220.	8.57	223.	8.80
5.000	309.	7.54	316.	9.53	314.	8.41	316.	8.70	318.	8.40
10.000	378.	7.98	409.	11.10	392.	9.76	396.	9.65	395.	9.09
20.000	445.	8.22	505.	12.60	470.	11.50	474.	11.40	466.	10.90
50.000	531.	8.57	642.	14.40	574.	14.10	576.	14.50	556.	14.40
100.000	595.	8.78	752.	15.80	654.	16.00	653.	17.20	620.	17.50
200.000	660.	8.96	871.	17.00	737.	17.90	730.	20.10	683.	20.80
500.000	744.	9.16	1040.	18.60	851.	20.40	833.	24.10	763.	25.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1364.0

THAMES RIVER NEAR EALING 02GD001

DRAINAGE AREA : 1340.0 SQ. KM.
REGULATED FLOW : CLASS :
PERIOD OF RECORD : 1967 - 1982

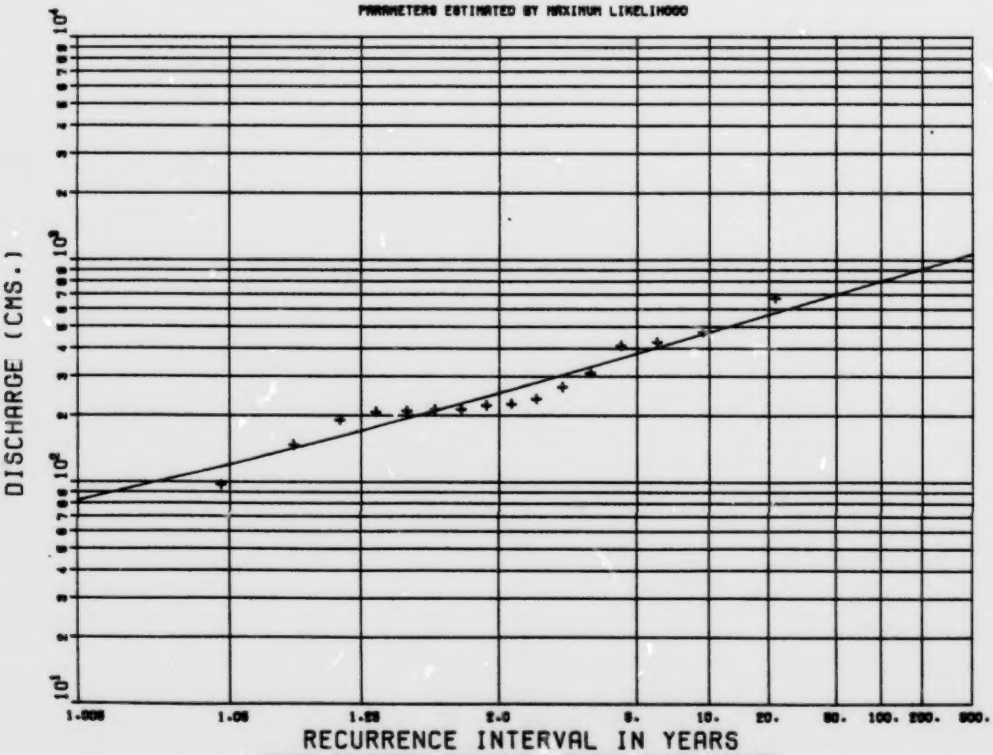
SAMPLE STATISTICS
MEAN = 282. S.D. = 145.2 C.S. = 1.4684 C.K. = 5.9470
SAMPLE STATISTICS (LOGS)
MEAN = 5.5351 S.D. = .4734 C.S. = .2328 C.K. = 4.2236
SAMPLE MIN = 97. SAMPLE MAX = 671. N = 16

PARAMETERS FOR GUMBEL I A = .010417 U = 222.
PARAMETERS FOR LOGNORMAL M = 5.5351 S = .4734
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 25. M = 5.4201 S = .5297
STATISTICS OF LOG(X-A)
MEAN = 5.4201 S.D. = .5297 C.S. = .0397 C.K. = 4.3846
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0551 B = .7381E+02 LOG(M) = 1.4679
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .4340E+01
A = .0450 B = .1036E+03
LOG(M)F= .8700 M = .2387E+01
DISTRIBUTION STATISTICS MEAN = 5.5351 S.D. = .4582 C.S. = .1965

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	62.		75.		82.		85.		83.	
1.050	115.		116.		119.		122.		123.	
1.250	177.		170.		169.		172.		169.	
2.000	257.		253.		250.		250.		249.	
2.330	278.	11.00	276.	11.90	273.	12.70	271.	12.50	271.	13.00
5.000	366.	11.80	378.	13.80	377.	14.40	371.	14.10	373.	14.70
10.000	439.	12.70	465.	16.00	470.	17.40	460.	17.10	472.	18.00
20.000	507.	13.40	552.	18.20	564.	21.10	552.	21.40	569.	22.70
50.000	597.	14.10	670.	20.90	695.	26.10	681.	28.20	710.	30.20
100.000	664.	14.80	762.	22.80	799.	30.00	786.	33.90	826.	36.50
200.000	731.	15.00	858.	24.60	909.	33.80	898.	39.90	952.	43.20
500.000	819.	15.40	991.	26.90	1060.	38.70	1060.	48.30	1130.	52.50

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

THAMES RIVER NEAR EALING 02GD001
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I366.1

TRENT RIVER AT GLEN ROSS 02HK004

DRAINAGE AREA : 12000.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1967 - 1982

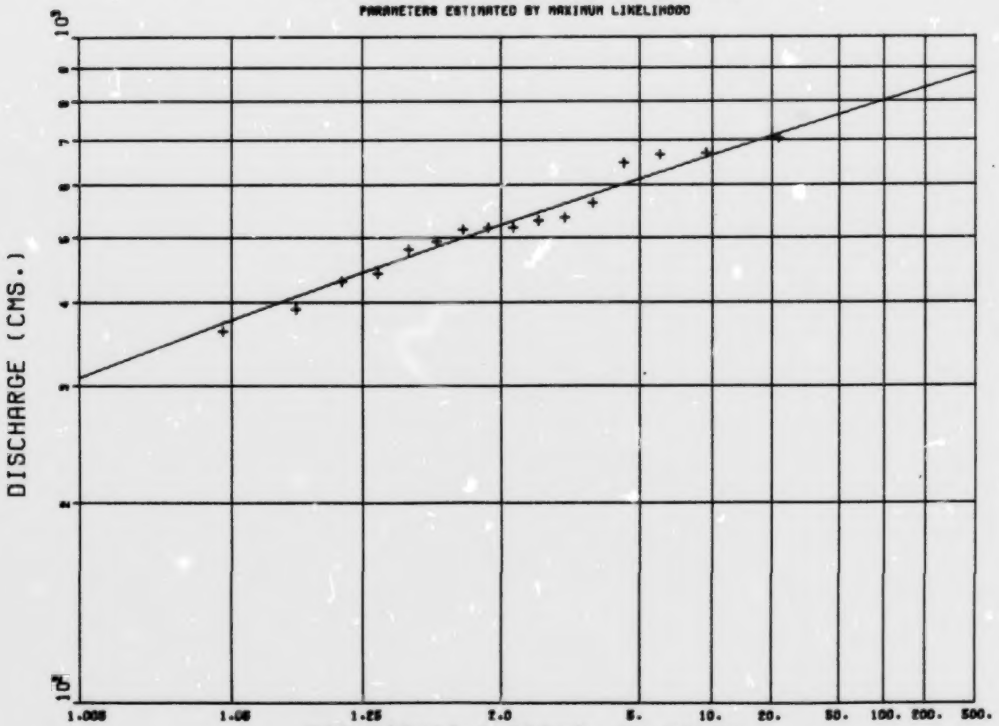
SAMPLE STATISTICS
MEAN = 529. S.D. = 101.1 C.S. = .2466 C.K. = 3.0551
SAMPLE STATISTICS (LOGS)
MEAN = 6.2541 S.D. = .1929 C.S. = -.1303 C.K. = 3.2142
SAMPLE MIN = 362. SAMPLE MAX = 705. N = 16

PARAMETERS FOR GUMBEL I A = .011492 U = 481.
PARAMETERS FOR LOGNORMAL M = 6.2541 S = .1929
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -152. M = 6.5136 S = .1487
STATISTICS OF LOG(X-A)
MEAN = 6.5136 S.D. = .1487 C.S. = -.0395 C.K. = 3.1498
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0126 B = .2358E+03 LOG(M) = 9.2158
ME= .1006E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0266 B = .4982E+02
LOG(M)F= 7.5776 M = .1954E+04
DISTRIBUTION STATISTICS MEAN = 6.2541 S.D. = .1875 C.S. = -.2834

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	336.		316.		308.		305.		309.	
1.050	385.		379.		376.		377.		376.	
1.250	440.		442.		443.		446.		443.	
2.000	513.		520.		522.		525.		522.	
2.330	532.	5.19	538.	4.86	540.	5.13	542.	4.98	540.	5.20
5.000	612.	6.41	612.	5.61	612.	5.41	610.	5.06	613.	5.44
10.000	677.	7.42	666.	6.51	664.	6.31	657.	5.62	664.	6.25
20.000	740.	8.31	714.	7.40	709.	7.61	697.	6.62	709.	7.55
50.000	821.	9.32	773.	8.50	763.	9.65	743.	8.43	763.	9.81
100.000	882.	9.97	815.	9.28	801.	11.30	774.	10.00	800.	11.70
200.000	942.	10.50	855.	10.00	837.	13.00	802.	11.70	835.	13.80
500.000	1020.	11.20	907.	10.90	883.	15.30	838.	14.10	879.	16.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

TRENT RIVER AT GLEN ROSS 02HK004
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I367.0

TRENT RIVER AT HEALEY FALLS - 02HK002

DRAINAGE AREA : 9090.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1950 - 1980

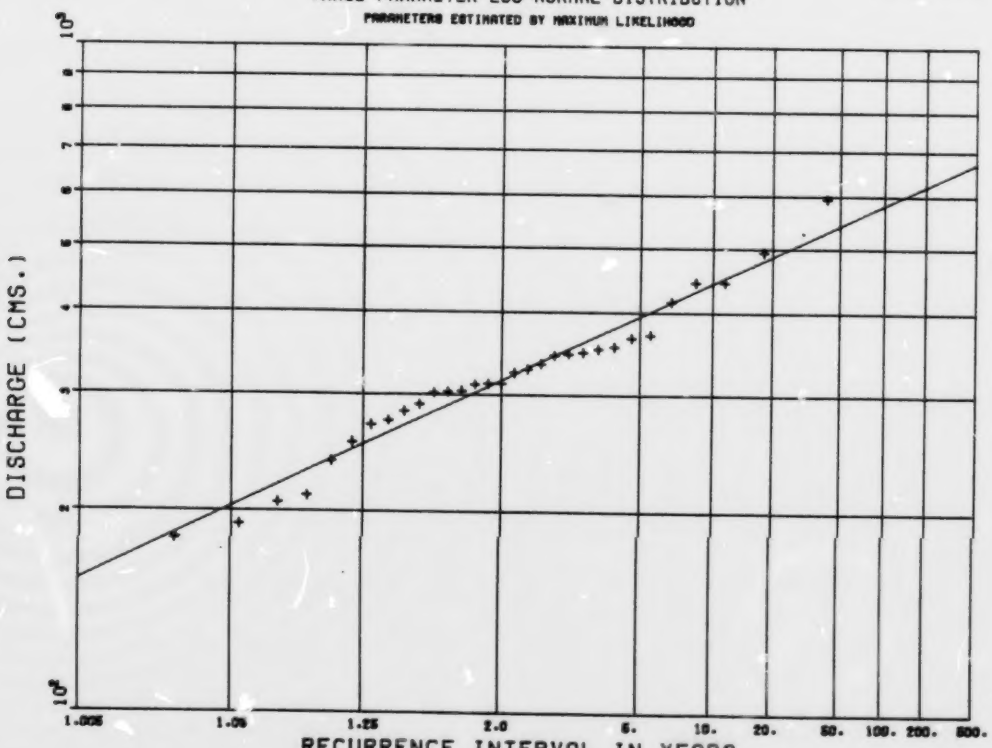
SAMPLE STATISTICS
MEAN = 326. S.D. = 88.1 C.S. = .9417 C.K. = 5.1911
SAMPLE STATISTICS (LOGS)
MEAN = 5.7524 S.D. = .2650 C.S. = -.0173 C.K. = 3.7895
SAMPLE MIN = 182. SAMPLE MAX = 594. N = 31

PARAMETERS FOR GUMBEL I A = .013861 U = 286.
PARAMETERS FOR LOGNORMAL M = 5.7524 S = .2650
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -11. M = 5.7883 S = .2557
STATISTICS OF LOG(X-A)
MEAN = 5.7883 S.D. = .2557 C.S. = .0135 C.K. = 3.8010
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0023 B = .1338E+05 LOG(M) =36.4141
ME= .6523E+16
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0018 B = .1987E+05
LOG(M)F=42.5048 M = .2881E+19
DISTRIBUTION STATISTICS MEAN = 5.7524 S.D. = .2607 C.S. = -.0142

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	165.		159.		158.		160.		158.	
1.050	206.		204.		203.		205.		203.	
1.250	252.		252.		252.		253.		252.	
2.000	312.		315.		315.		315.		315.	
2.330	328.	5.02	330.	4.80	331.	5.09	330.	4.85	330.	5.15
5.000	394.	5.93	394.	5.54	394.	5.50	392.	5.26	394.	5.54
10.000	448.	6.68	442.	6.42	442.	6.52	440.	6.23	442.	6.49
20.000	500.	7.33	487.	7.30	486.	7.90	483.	7.69	486.	7.94
50.000	567.	8.03	543.	8.39	541.	10.00	537.	10.10	541.	10.40
100.000	618.	8.48	583.	9.16	581.	11.70	576.	12.10	581.	12.40
200.000	668.	8.87	623.	9.89	620.	13.40	614.	14.30	621.	14.60
500.000	734.	9.30	676.	10.80	671.	15.60	664.	17.30	672.	17.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

TRENT RIVER AT HEALEY FALLS - 02HK002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I368.0

TROUT CREEK NEAR FAIRVIEW 02GD019

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
---- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

DRAINAGE AREA : 36.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1967 - 1982

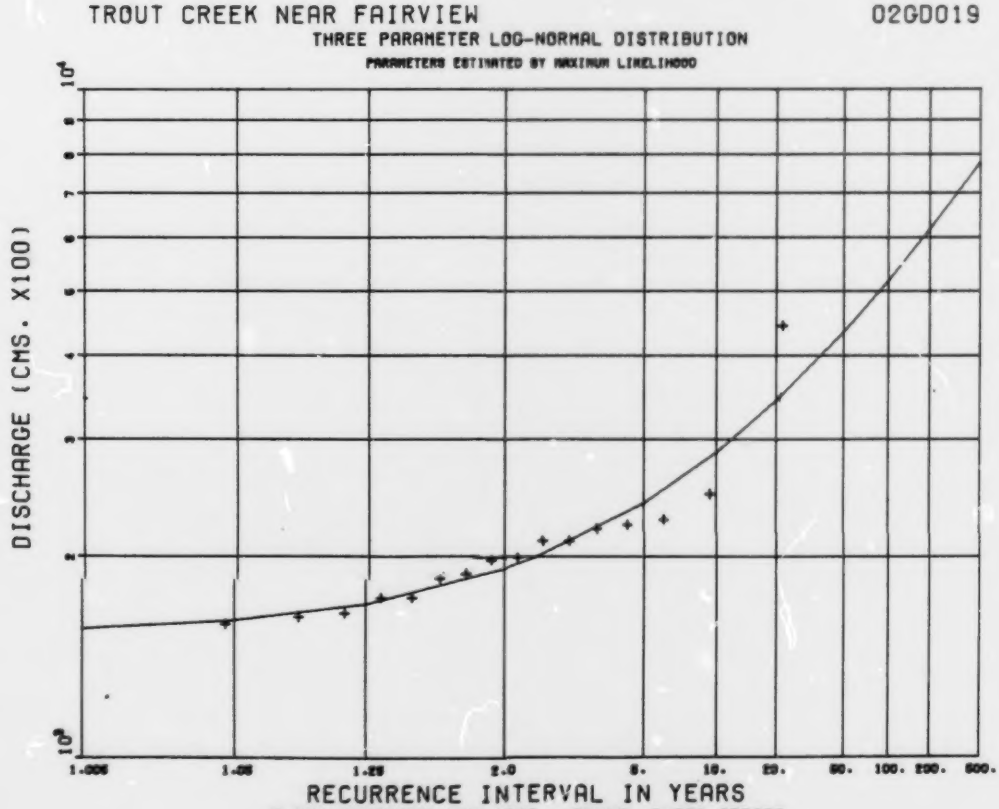
SAMPLE STATISTICS
MEAN = 2119. S.D. = 668.1 C.S. = 3.0380 C.K. = 14.3987
SAMPLE STATISTICS (LOGS)
MEAN = 7.6259 S.D. = .2436 C.S. = 2.1960 C.K. = 10.3047
SAMPLE MIN = 1590. SAMPLE MAX = 4430. N = 16

PARAMETERS FOR GUMBEL I A = .003876 U = 1894.
PARAMETERS FOR LOGNORMAL M = 7.6259 S = .2436
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1533. M = 5.9470 S = .9687
STATISTICS OF LOG(X-A)
MEAN = 5.9470 S.D. = .9687 C.S. = -.1399 C.K. = 4.1533
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2675 B = .4294E+00 LOG(M) = 7.4040
ME= .1642E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	1350.		1090.		1560.		0.		0.	
1.050	1530.		1370.		1610.		0.		0.	
1.250	1740.		1670.		1707.		0.		0.	
2.000	2010.		2050.		1920.		0.		0.	
2.330	2080.	4.95	2140.	6.14	1998.	5.70	0.	0.00	0.	0.00
5.000	2380.	6.15	2520.	7.09	2400.	10.20	0.	0.00	0.	0.00
10.000	2630.	7.16	2800.	8.22	2860.	15.50	0.	0.00	0.	0.00
20.000	2860.	8.04	3060.	9.34	3420.	21.60	0.	0.00	0.	0.00
50.000	3160.	9.04	3380.	10.70	4330.	30.00	0.	0.00	0.	0.00
100.000	3390.	9.69	3610.	11.70	5170.	36.30	0.	0.00	0.	0.00
200.000	3620.	10.30	3840.	12.70	6170.	42.60	0.	0.00	0.	0.00
500.000	3910.	10.90	4140.	13.80	7760.	50.90	0.	0.00	0.	0.00

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I369.0

TROUT CREEK NEAR ST. MARY'S (1946-64) 02GD009

DRAINAGE AREA : 140.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1946 - 1964

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	52.	29.	.799	3.736
LN X SERIES	3.79	.62	-.542	4.303

X(MIN)= 10. CMS. TOTAL SAMPLE SIZE= 19
X(MAX)= 109. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

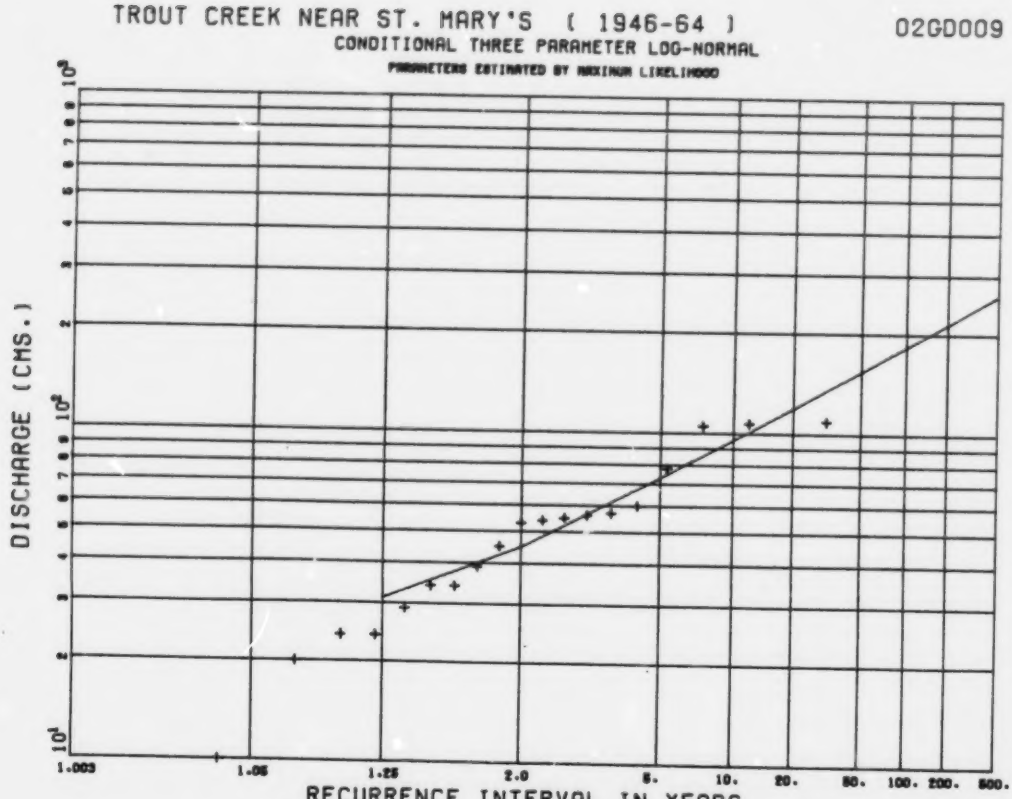
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	55.	28.	.886	3.774
LN X SERIES	3.87	.52	-.838	3.072
LN (X-A) SERIES	3.62	.67	-.216	3.183

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 9.3472 M = 3.6160 S = .6676

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	31.
2.000	.500	45.
2.330	.429	50.
5.000	.200	73.
10.000	.100	95.
20.000	.050	119.
50.000	.020	154.
100.000	.010	183.
200.000	.005	214.
500.000	.002	261.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I370.0
I-387

TROUT CREEK NEAR ST. MARY+S (1965-82) 02GD009

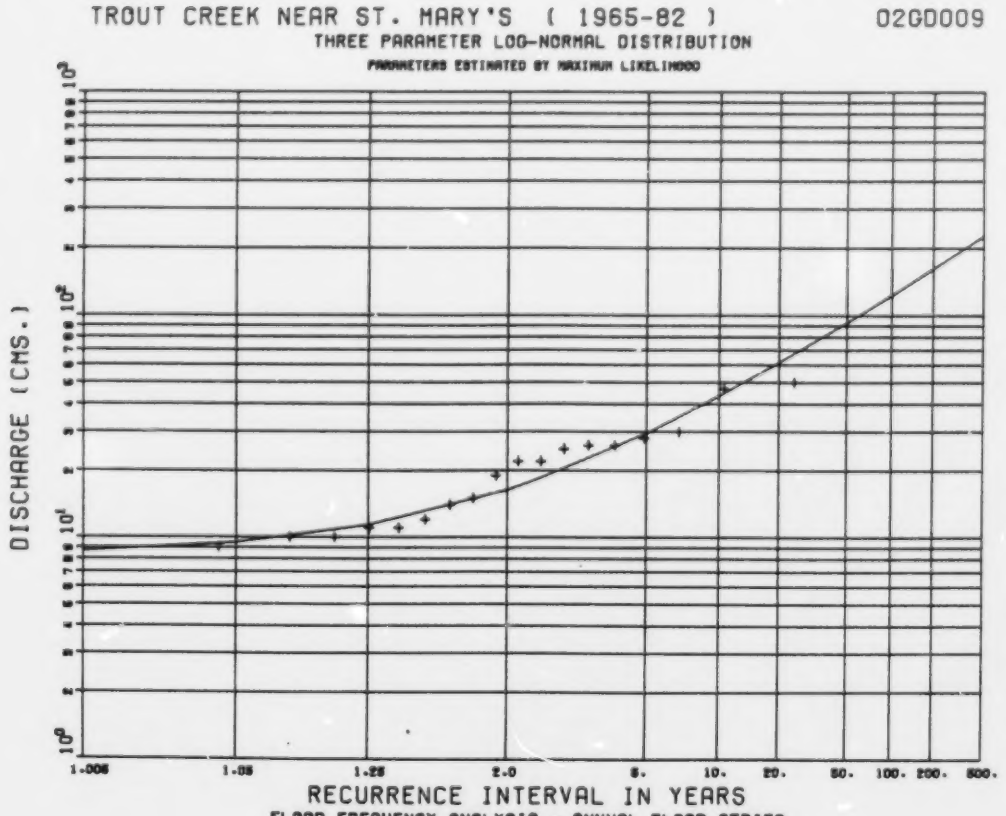
DRAINAGE AREA : 140.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1965 - 1982

SAMPLE STATISTICS
MEAN = 22. S.D. = 12.0 C.S. = 1.2104 C.K. = 4.7282
SAMPLE STATISTICS (LOGS)
MEAN = 2.9326 S.D. = .5296 C.S. = .2890 C.K. = 2.7216
SAMPLE MIN = 9. SAMPLE MAX = 50. N = 18

PARAMETERS FOR GUMBEL I A = .121908 U = 16.
PARAMETERS FOR LOGNORMAL M = 2.932E S = .5296
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 8. M = 2.0969 S = 1.1394
STATISTICS OF LOG(X-A)
MEAN = 2.0969 S.D. = 1.1394 C.S. = -.4639 C.K. = 2.8411
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0765 B = .478 E+02 LOG(M) = -.7321
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .4809E+00
A = .5663 B = .1331E+01
LOG(M)F= 2.1788 M = .8835E+01
DISTRIBUTION STATISTICS MEAN = 2.9326 S.D. = .6534 C.S. = 1.7334

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	3.		5.		9.		9.		6.	
1.050	7.		8.		9.		9.		8.	
1.250	12.		12.		11.		11.		12.	
2.000	19.		19.		16.		16.		18.	
5.330	27.		27.		18.		18.		25.	
5.000	31.	11.60	34.	12.60	29.	15.18	29.	0.00	29.	13.90
10.000	35.	12.20	37.	14.50	41.	22.60	44.	0.00	38.	15.70
20.000	41.	12.80	45.	16.80	61.	29.50	67.	0.00	47.	19.40
50.000	48.	13.40	56.	19.10	93.	37.10	116.	0.00	60.	24.60
100.000	54.	14.10	64.	22.00	123.	45.00	181.	0.00	72.	33.00
200.000	60.	14.40	74.	24.00	161.	52.00	279.	0.00	85.	40.10
500.000	67.	15.10	86.	25.90	225.	57.70	497.	0.00	104.	47.50
				28.30		64.70		0.00		57.90

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1370.1

TROUTLAKE RIVER BELOW BIG FALLS 05QC003

DRAINAGE AREA : 2370.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1970 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	47.	22.	1.584	6.958
LN X SERIES	3.75	.45	-.242	6.617

X(MIN)= 16. CMS. TOTAL SAMPLE SIZE= 13
X(MAX)= 104. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

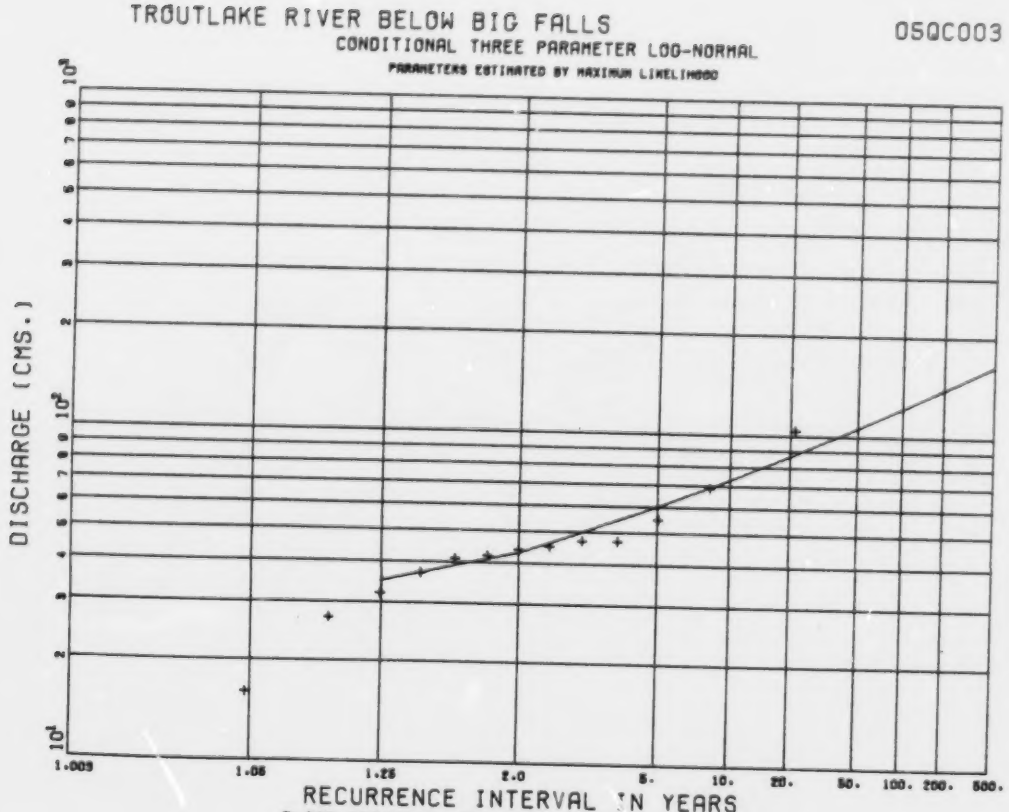
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	49.	20.	2.003	10.265
LN X SERIES	3.83	.35	.976	6.869
LN (X-A) SERIES	3.21	.62	.845	6.868

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 19.5730 M = 3.2097 S = .6188

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	35.
2.000	.500	43.
2.330	.429	46.
5.000	.200	60.
10.000	.100	73.
20.000	.050	87.
50.000	.020	106.
100.000	.010	122.
200.000	.005	139.
500.000	.002	164.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I371.0

TURTLE RIVER NEAR MINE CENTRE 05PB014

DRAINAGE AREA : 4870.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1921 - 1982

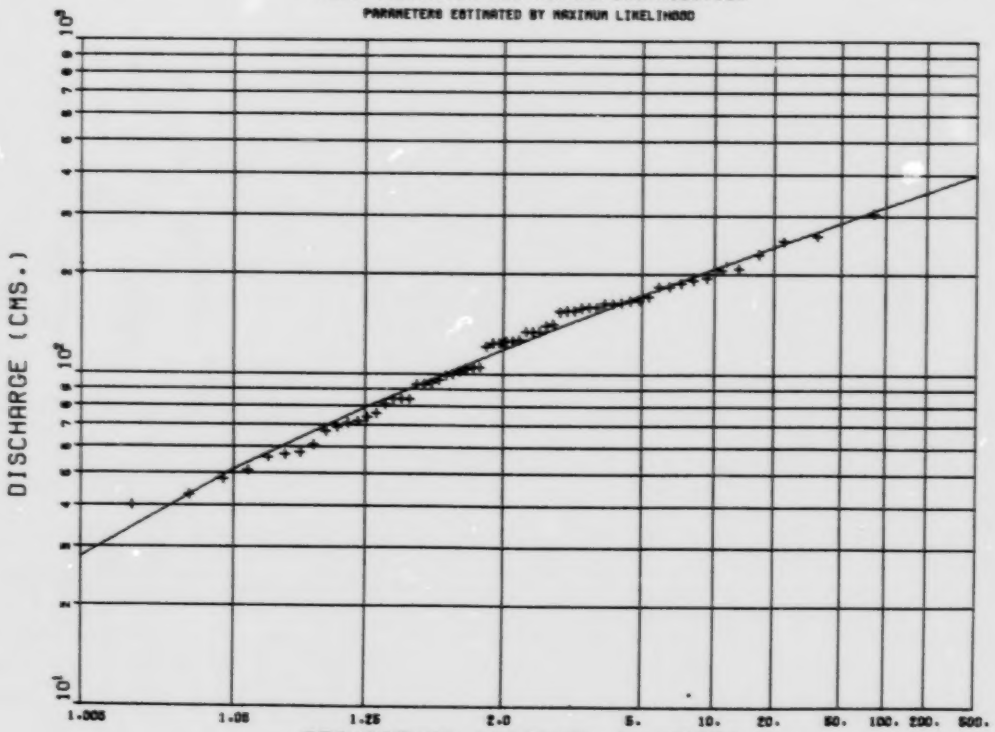
SAMPLE STATISTICS
MEAN = 128. S.D. = 57.6 C.S. = .7173 C.K. = 3.5693
SAMPLE STATISTICS (LOGS)
MEAN = 4.7480 S.D. = .4726 C.S. = -.2867 C.K. = 2.5977
SAMPLE MIN = 40. SAMPLE MAX = 385. N = 62

PARAMETERS FOR GUMBEL I A = .021646 U = 101.
PARAMETERS FOR LOGNORMAL M = 4.7480 S = .4726
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -28. M = 4.9841 S = .3718
STATISTICS OF LOG(X-A)
MEAN = 4.9841 S.D. = .3718 C.S. = -.0928 C.K. = 2.5111
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0677 B = .4867E+02 LOG(M) = 8.0450
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3118E+04
A = -.1130 B = .1746E+02
LOG(M)F= 6.7208 M = .8295E+03
DISTRIBUTION STATISTICS MEAN = 4.7480 S.D. = .4722 C.S. = -.4787

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	24.		34.		28.		28.		30.	
1.050	50.		53.		51.		50.		51.	
1.250	79.		78.		79.		79.		78.	
2.000	118.		115.		118.		120.		118.	
2.330	128.	5.81	125.	6.05	128.	6.14	130.	6.22	128.	6.45
5.000	171.	6.20	172.	6.99	172.	6.40	173.	6.07	173.	6.48
10.000	205.	6.61	211.	8.18	207.	7.44	205.	6.48	208.	7.21
20.000	239.	6.96	251.	9.21	241.	8.84	234.	7.34	241.	8.64
50.000	282.	7.33	305.	10.60	285.	10.60	269.	8.09	283.	11.20
100.000	314.	7.56	346.	11.60	319.	12.50	293.	18.70	313.	13.50
200.000	346.	7.75	390.	12.50	352.	14.00	316.	12.40	343.	15.90
500.000	388.	7.96	450.	13.60	398.	16.10	344.	14.90	383.	19.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

TURTLE RIVER NEAR MINE CENTRE 05PB014
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I372.0

TWENTY MILE CREEK AT BALLS FALLS 02HA006

DRAINAGE AREA = 293.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1957 - 1982

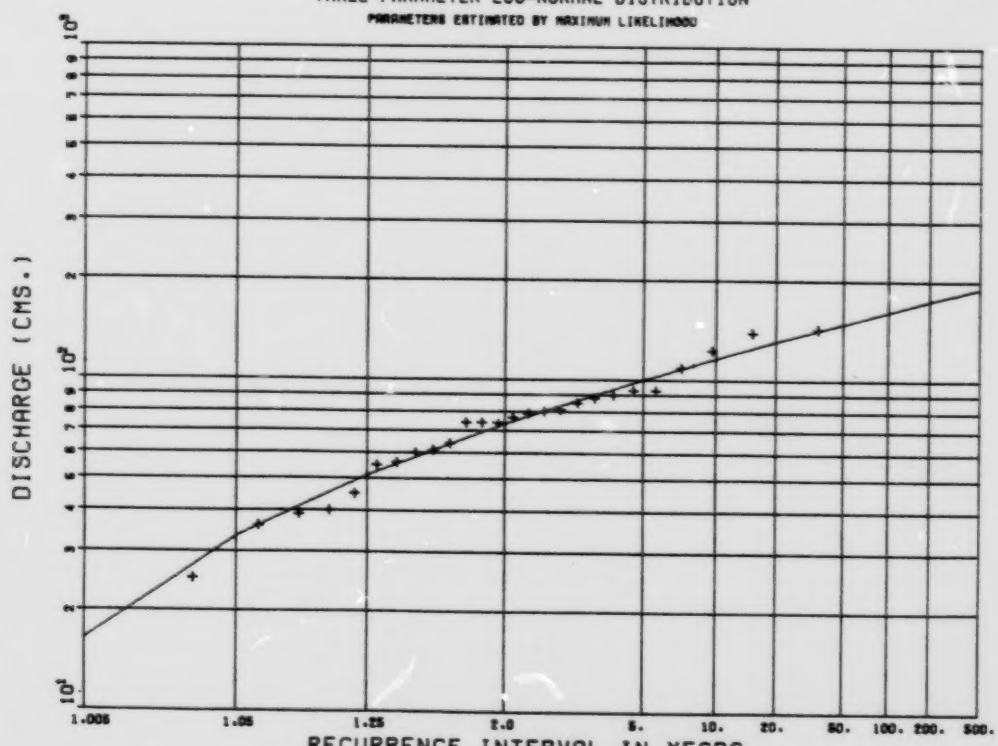
SAMPLE STATISTICS
MEAN = 76. S.D. = 29.7 C.S. = .5365 C.K. = 3.6584
SAMPLE STATISTICS (LOGS)
MEAN = 4.2556 S.D. = .4191 C.S. = -.5475 C.K. = 3.7060
SAMPLE MIN = 25. SAMPLE MAX = 143. N = 26

PARAMETERS FOR GUMBEL I A = .039910 U = 62.
PARAMETERS FOR LOGNORMAL M = 4.2556 S = .4191
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -58. M = 4.8738 S = .2210
STATISTICS OF LOG(X-A)
MEAN = 4.8738 S.D. = .2210 C.S. = -.8254 C.K. = 3.2838
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1147 B = .1335E+02 LOG(P) = 5.7867
ME= .3260E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1254 B = .1085E+02
LOG(M)= 5.6156 M = .2747E+03
DISTRIBUTION STATISTICS MEAN = 4.2556 S.D. = .4129 C.S. = -.6072

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	21.		24.		16.		19.		19.	
1.050	35.		36.		33.		34.		33.	
1.250	51.		50.		51.		51.		50.	
2.000	72.		71.		73.		74.		73.	
2.330	77.	8.11	76.	8.28	78.	8.66	79.	8.24	79.	8.84
5.000	100.	8.86	100.	9.57	100.	7.57	100.	7.83	101.	8.15
10.000	119.	9.56	121.	11.10	116.	8.58	116.	8.08	117.	8.69
20.000	137.	10.20	140.	12.60	131.	10.50	129.	8.92	131.	10.50
50.000	160.	10.80	167.	14.50	148.	12.90	143.	10.80	147.	14.10
100.000	178.	11.20	187.	15.80	161.	14.80	153.	12.50	158.	17.30
200.000	195.	11.50	208.	17.10	174.	16.70	162.	14.50	168.	20.70
500.000	218.	11.90	236.	18.60	190.	19.20	173.	17.20	180.	25.30

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

TWENTY MILE CREEK AT BALLS FALLS 02HA006
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I373.0

UXBRIDGE BROCK AT UXBRIDGE 02EC101

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

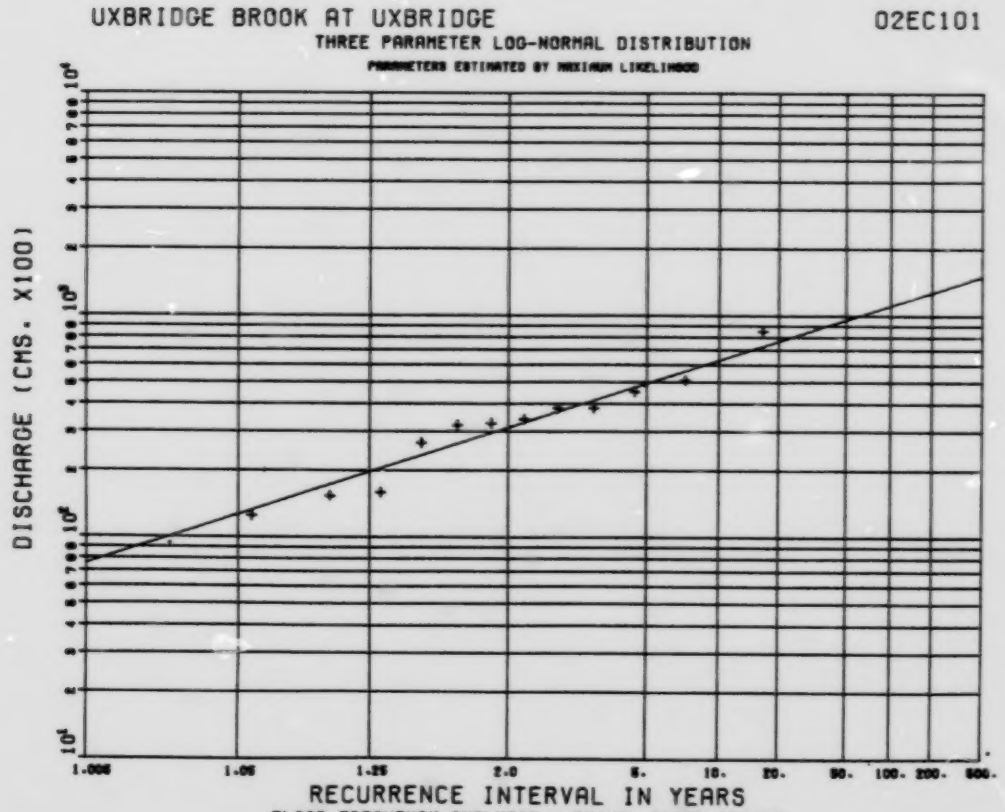
DRAINAGE AREA : 24.3 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 356. S.D. = 196.2 C.S. = 1.4039 C.K. = 7.1284
SAMPLE STATISTICS (LOGS)
MEAN = 5.7405 S.D. = .5488 C.S. = -.1422 C.K. = 3.9435
SAMPLE MIN = 125. SAMPLE MAX = 851. N = 12

PARAMETERS FOR GUMBEL I A = .887216 U = 273.
PARAMETERS FOR LOGNORMAL M = 5.7405 S = .5488
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1. M = 5.7446 S = .5458
STATISTICS OF LOG(X-A)
MEAN = 5.7446 S.D. = .5458 C.S. = -.1374 C.K. = 3.9466
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0298 B = .1979E+03 LOG(M) =13.4589
ME= .6945E+06
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0478 B = .1268E+03
LOG(M)F=11.5121 M = .9991E+05
DISTRIBUTION STATISTICS MEAN = 5.7405 S.D. = .5251 C.S. = -.1820

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	42.		76.		76.		74.		71.	
1.050	119.		126.		126.		128.		124.	
1.250	207.		196.		196.		201.		197.	
2.000	324.		311.		311.		314.		315.	
2.330	353.	14.40	343.	15.90	343.	16.70	347.	16.20	347.	17.00
5.000	481.	15.00	494.	18.40	494.	18.40	486.	16.90	495.	17.80
10.000	585.	15.80	628.	21.40	628.	21.20	603.	19.10	623.	20.40
20.000	685.	16.50	767.	24.30	766.	24.20	718.	21.90	749.	23.60
50.000	814.	17.30	959.	27.90	958.	32.20	869.	29.50	920.	32.00
100.000	911.	17.80	1110.	30.50	1110.	36.70	984.	35.20	1050.	38.30
200.000	1010.	18.20	1260.	32.90	1270.	41.20	1100.	41.20	1190.	45.00
500.000	1130.	18.60	1510.	35.90	1509.	46.90	1260.	49.70	1370.	54.10

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I374.0

VERMILION RIVER NEAR VAL CARON 02CF011

DRAINAGE AREA : 784.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1971 - 1982

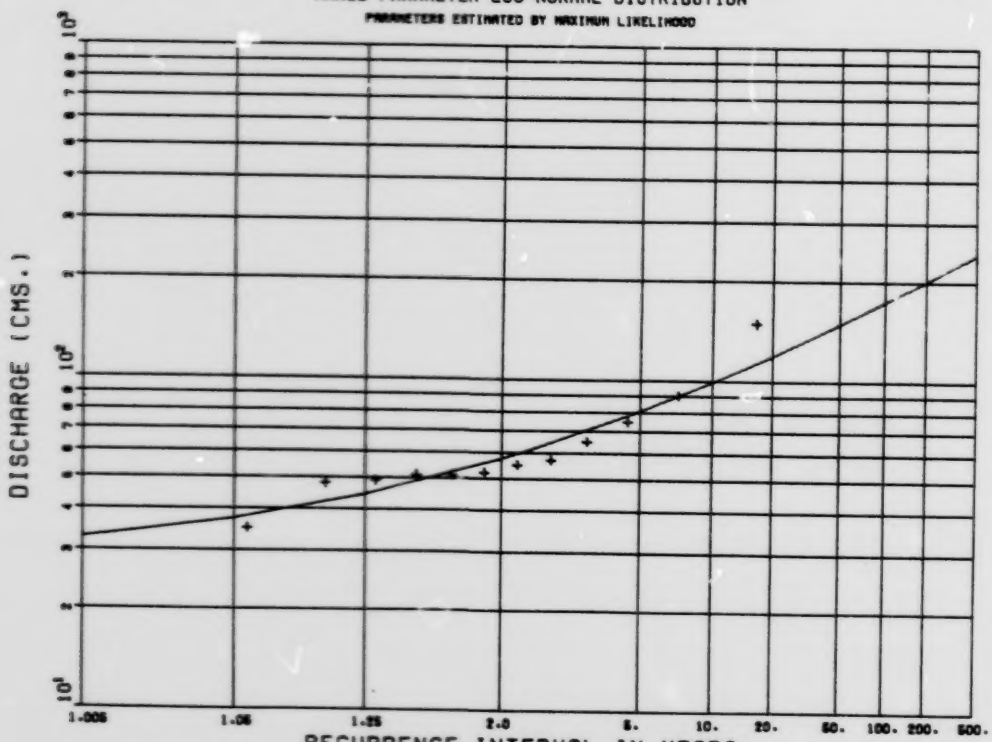
SAMPLE STATISTICS
MEAN = 65. S.D. = 38.1 C.S. = 2.2928 C.K. = 9.9821
SAMPLE STATISTICS (LOGS)
MEAN = 4.0983 S.D. = .3708 C.S. = 1.3365 C.K. = 6.6214
SAMPLE MIN = 35. SAMPLE MAX = 149. N = 12

PARAMETERS FOR GUMBEL I A = .861567 U = 54.
PARAMETERS FOR LOGNORMAL P = 4.0983 S = .3708
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 28. M = 3.3852 S = .6874
STATISTICS OF LOG(X-A)
MEAN = 3.3852 S.D. = .6874 C.S. = .1619 C.K. = 5.8128
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .2478 B = .2239E+01 LOG(M) = 3.5434
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .3458E+02
A = .1573 B = .4790E+01
LOG(M)= 3.3423 M = .2828E+02
DISTRIBUTION STATISTICS MEAN = 4.0983 S.D. = .3454 C.S. = .9138

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	27.		23.		33.		33.		36.	
1.050	36.		33.		37.		38.		39.	
1.250	46.		44.		44.		45.		44.	
2.000	60.		60.		57.		57.		56.	
2.330	63.	9.43	64.	10.80	61.	11.30	61.	10.50	59.	14.10
5.000	78.	16.80	82.	12.50	80.	15.10	78.	14.20	78.	17.00
10.000	90.	12.00	97.	14.40	99.	19.80	96.	18.90	99.	22.90
20.000	102.	13.00	111.	16.40	119.	25.10	114.	24.30	123.	33.20
50.000	117.	14.10	129.	18.90	149.	32.20	143.	32.30	163.	51.30
100.000	128.	14.80	143.	20.60	174.	37.60	168.	38.80	200.	67.20
200.000	140.	15.30	157.	22.20	201.	42.90	197.	45.50	247.	84.70
500.000	155.	16.00	175.	24.30	241.	49.70	241.	54.80	324.	110.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

VERMILION RIVER NEAR VAL CARON 02CF011
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I375.0

VERMILLION RIVER AT LORNE FALLS (1918-1953) 02CF004

DRAINAGE AREA : 4190.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1918 - 1953

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	172.	47.	.875	4.414
LN X SERIES	5.11	.27	.063	3.361

X(MIN)= 92. CMS. TOTAL SAMPLE SIZE= 36
X(MAX)= 318. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

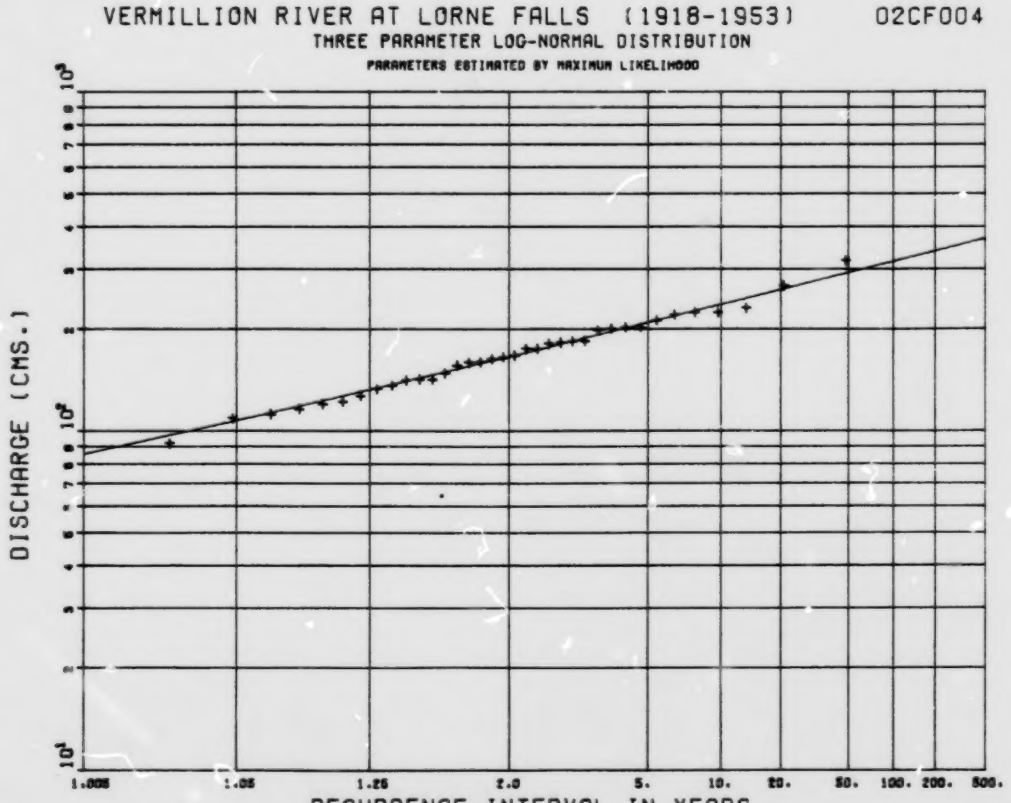
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	174.	46.	.802	5.026
LN X SERIES	5.13	.25	.263	3.262
LN (X-A) SERIES	4.65	.40	-.042	2.998

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 61.5068 N = 4.6459 S = .4046

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	115.
1.250	.800	136.
2.000	.500	164.
2.330	.429	172.
5.000	.200	207.
10.000	.100	235.
20.000	.050	263.
50.000	.020	300.
100.000	.010	327.
200.000	.005	356.
500.000	.002	394.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1376.0

VERMILLION RIVER AT LORNE FALLS (1954-82) 02CF004

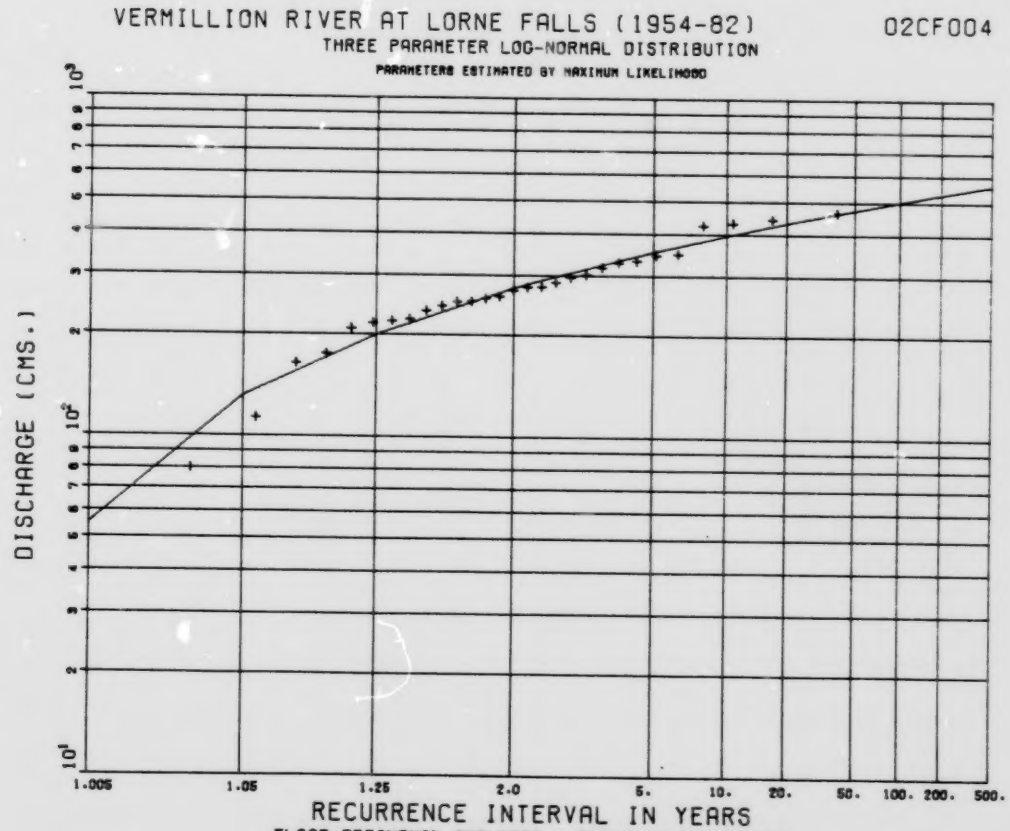
DRAINAGE AREA : 4190.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1954 - 1982

SAMPLE STATISTICS
MEAN = 277. S.D. = 91.6 C.S. = .1704 C.K. = 3.5597
SAMPLE STATISTICS (LOGS)
MEAN = 5.5620 S.D. = .3828 C.S. = -1.1883 C.K. = 5.8487
SAMPLE MIN = 80. SAMPLE MAX = 465. N = 29

PARAMETERS FOR GUMBEL I A = .011529 U = 233.
PARAMETERS FOR LOGNORMAL M = 5.5620 S = .3828
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -1396. M = 7.4213 S = .0547
STATISTICS OF LOG(X-A)
MEAN = 7.4213 S.D. = .0547 C.S. = .0007 C.K. = 3.6229
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.2274 B = .2933E+01 LOG(M) = 6.2262
ME= .4958E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1757 B = .4530E+01
LOG(M)= 6.3579 M = .5771E+03
DISTRIBUTION STATISTICS MEAN = 5.5620 S.D. = .3739 C.S. = -.9336

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	88.		97.		55.		72.		64.	
1.050	136.		139.		131.		130.		126.	
1.250	191.		189.		199.		196.		197.	
2.000	264.		260.		275.		276.		280.	
2.330	283.	7.23	279.	7.16	291.	6.37	293.	6.59	298.	7.91
5.000	363.	8.99	359.	8.27	353.	5.88	354.	5.85	359.	5.42
10.000	428.	8.70	425.	9.59	396.	6.33	399.	5.57	395.	6.42
20.000	490.	9.29	489.	10.90	432.	7.25	430.	5.58	420.	9.73
50.000	571.	9.92	571.	12.50	473.	8.78	462.	6.05	444.	14.70
100.000	632.	10.30	634.	13.70	501.	10.00	481.	6.68	457.	18.40
200.000	692.	10.60	698.	14.80	528.	11.30	497.	7.46	467.	21.30
500.000	772.	11.00	784.	16.10	560.	13.00	514.	8.63	477.	25.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I376.1

VEUVE RIVER NEAR VERNER 0200012

DRAINAGE AREA = 741.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1973 - 1983

SAMPLE STATISTICS
MEAN = 135. S.D. = 38.1 C.S. = .1945 C.K. = 3.9225
SAMPLE STATISTICS (LOGS)
MEAN = 4.8703 S.D. = .2972 C.S. = -.5342 C.K. = 4.6760
SAMPLE MIN = 71. SAMPLE MAX = 202. N = 11

PARAMETERS FOR GUMBEL I A = .030012 U = 118.
PARAMETERS FOR LOGNORMAL M = 4.8703 S = .2972
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -270. M = 6.0012 S = .0941
STATISTICS OF LOG(X-A)
MEAN = 6.0012 S.D. = .0941 C.S. = -.0284 C.K. = 4.0096
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0794 B = .1402E+02 LOG(M) = 5.9830
ME= .3966E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1168 B = .6215E+01
LOG(M)F= 5.5959 M = .2693E+03
DISTRIBUTION STATISTICS MEAN = 4.8703 S.D. = .2911 C.S. = -.8023

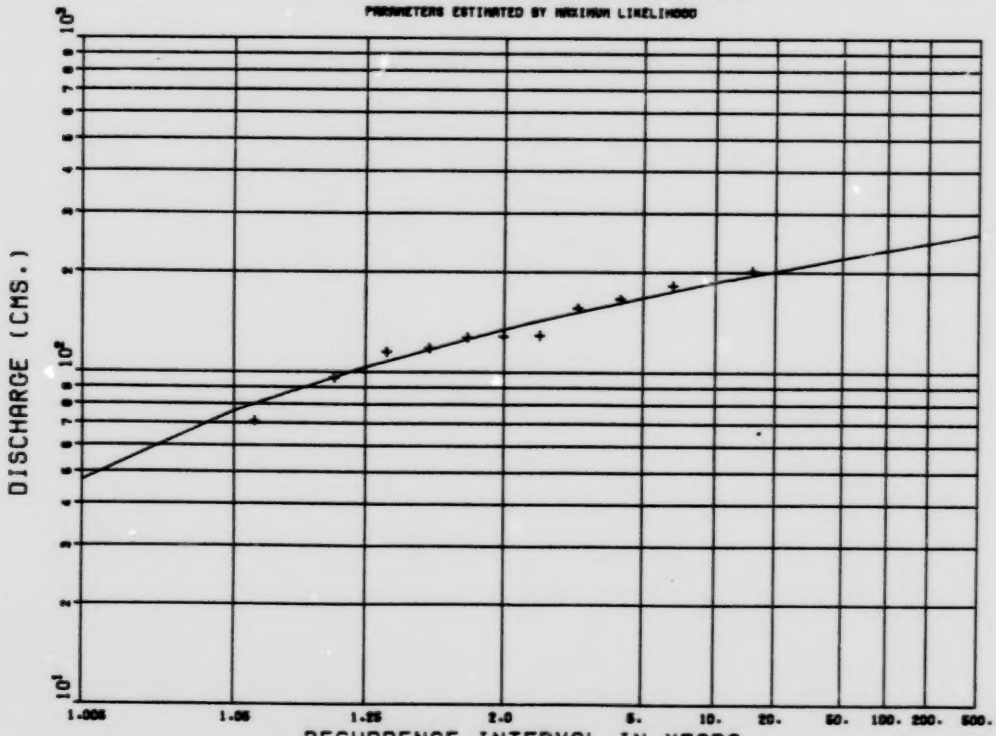
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	62.		61.		47.		68.		62.	
1.050	81.		80.		76.		76.		77.	
1.250	102.		101.		103.		104.		103.	
2.000	130.		130.		134.		135.		134.	
2.330	137.	9.31	137.	9.83	141.	8.94	142.	8.60	141.	9.64
5.000	168.	10.80	167.	10.40	167.	9.67	167.	7.86	168.	8.93
10.000	193.	12.10	191.	12.10	186.	9.61	183.	7.74	187.	9.54
20.000	217.	13.10	213.	13.70	201.	11.20	195.	8.10	202.	11.50
50.000	248.	14.30	240.	15.80	220.	13.80	208.	9.26	220.	15.60
100.000	271.	15.00	260.	17.20	233.	15.80	216.	10.50	232.	18.90
200.000	294.	15.60	280.	18.60	245.	18.00	223.	11.90	242.	22.60
500.000	325.	16.30	307.	20.30	260.	20.80	231.	14.00	255.	27.60

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

90 VEUVE RIVER NEAR VERNER 0200012

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I377.0

WABIGOON RIVER AT DRYDEN 05CD016

DRAINAGE AREA : 2300.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1971 - 1982

SAMPLE STATISTICS
MEAN = 56. S.D. = 37.6 C.S. = .3069 C.K. = 2.6681
SAMPLE STATISTICS (LOGS)
MEAN = 3.7642 S.D. = .8155 C.S. = -.3385 C.K. = 2.4813
SAMPLE MIN = 13. SAMPLE MAX = 121. N = 12

PARAMETERS FOR GUMBEL I A = .033824 U = 39.
PARAMETERS FOR LOGNORMAL M = 3.7642 S = .8155
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 12. M = 3.0576 S = 1.6189
STATISTICS OF LOG(X-A)
MEAN = 3.0576 S.D. = 1.6189 C.S. = -.9563 C.K. = 3.6647
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1380 B = .3490E+02 LOG(M) = 8.5824
ME= .5337E+04

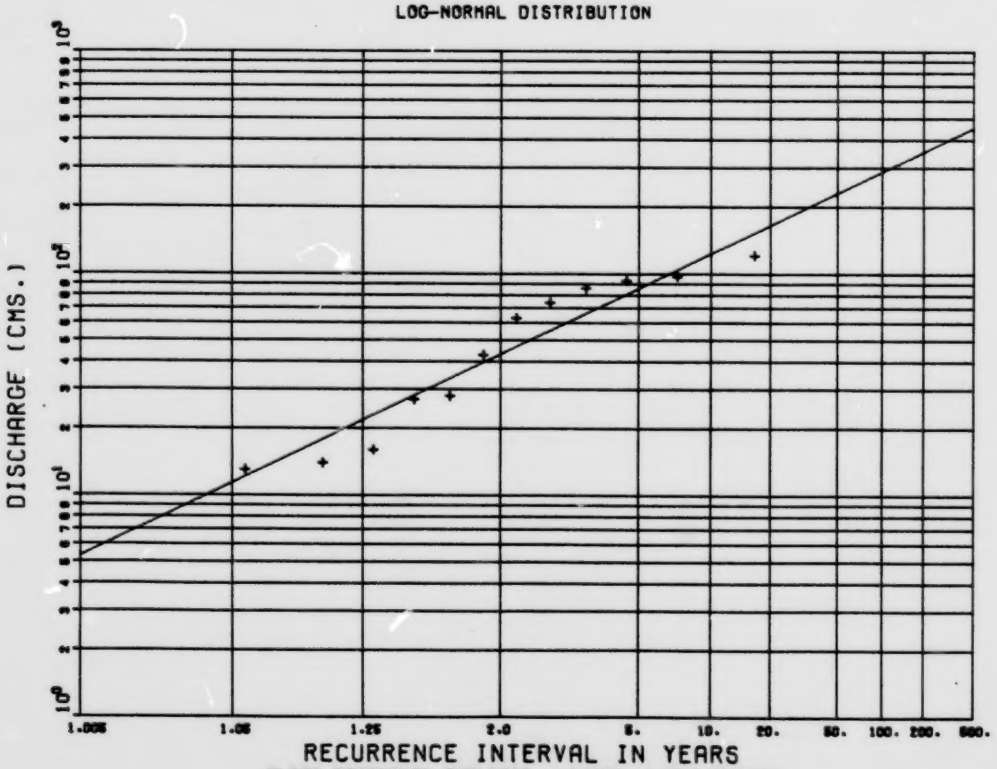
NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-11.		5.		12.		0.		4.	
1.050	6.		11.		14.		0.		11.	
1.250	25.		22.		18.		0.		16.	
2.000	50.		43.		33.		0.		45.	
2.330	56.	19.30	50.	23.70	41.	33.10	0.	0.00	52.	25.30
5.000	83.	18.50	86.	27.40	95.	47.60	0.	0.00	97.	25.00
10.000	105.	18.70	123.	31.80	182.	59.30	0.	0.00	119.	27.60
20.000	127.	19.10	165.	36.10	317.	69.90	0.	0.00	152.	33.00
50.000	154.	19.50	230.	41.50	604.	82.40	0.	0.00	198.	43.10
100.000	175.	19.70	287.	45.30	931.	90.90	0.	0.00	235.	51.90
200.000	195.	20.00	353.	48.90	1390.	98.80	0.	0.00	273.	61.40
500.000	223.	20.20	452.	53.40	2270.	109.00	0.	0.00	325.	74.58

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

WABIGOON RIVER AT DRYDEN 05QD016

LOG-NORMAL DISTRIBUTION



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1378.0

WABIGOON RIVER BELOW RAILWAY BRIDGE,NEAR QUIBELL 05QD002

DRAINAGE AREA : 6458.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1928 - 1953

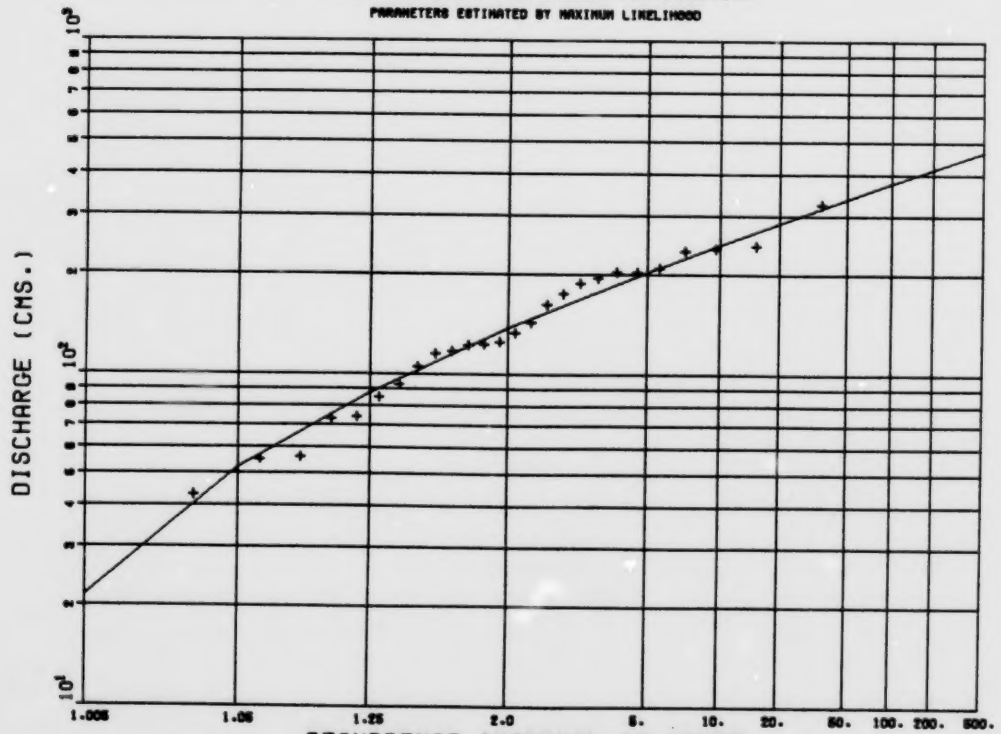
SAMPLE STATISTICS
MEAN = 148. S.D. = 70.2 C.S. = .5677 C.K. = 3.3547
SAMPLE STATISTICS (LOGS)
MEAN = 4.8758 S.D. = .5185 C.S. = -.4232 C.K. = 2.9258
SAMPLE MIN = 43. SAMPLE MAX = 325. N = 26

PARAMETERS FOR GUMBEL I A = .017686 U = 115.
PARAMETERS FOR LOGNORMAL M = 4.8758 S = .5185
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -60. M = 5.2801 S = .3425
STATISTICS OF LOG(X-A)
MEAN = 5.2801 S.D. = .3425 C.S. = -.0997 C.K. = 2.6852
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1097 B = .2233E+02 LOG(M) = 7.3262
ME= .1520E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1909 B = .7365E+01
LOG(M)F= 6.2620 M = .5348E+03
DISTRIBUTION STATISTICS MEAN = 4.8758 S.D. = .5182 C.S. = -.7370

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	20.		35.		21.		24.		28.	
1.050	52.		56.		52.		51.		53.	
1.250	86.		85.		87.		87.		86.	
2.000	136.		131.		137.		140.		136.	
2.330	148.	9.55	144.	10.20	149.	10.10	152.	10.10	149.	10.90
5.000	200.	10.00	203.	11.80	202.	10.10	204.	9.35	204.	10.50
10.000	243.	10.60	255.	13.70	245.	11.60	241.	9.35	248.	11.40
20.000	284.	11.10	308.	15.60	285.	13.60	272.	9.97	288.	13.70
50.000	337.	11.60	380.	17.90	337.	16.70	308.	11.60	337.	18.00
100.000	376.	12.00	438.	19.60	376.	19.00	331.	13.30	372.	21.90
200.000	416.	12.20	498.	21.10	415.	21.40	351.	15.20	407.	26.00
500.000	468.	12.50	584.	23.10	467.	24.40	376.	18.00	450.	31.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

WABIGOON RIVER BELOW RAILWAY BRIDGE,NEAR QUIBELL 05QD002
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I379.0

WABIGOON RIVER NEAR QUIBELL 05QD006

DRAINAGE AREA : 6370.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1954 - 1982

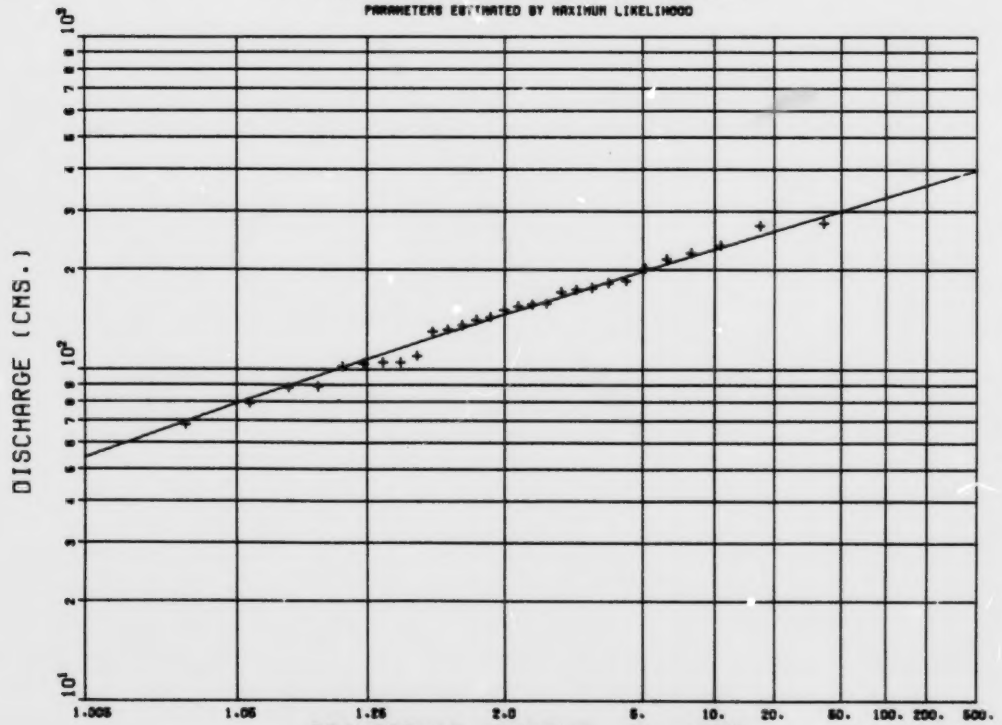
SAMPLE STATISTICS
MEAN = 154. S.D. = 54.9 C.S. = .5763 C.K. = 3.1784
SAMPLE STATISTICS (LOGS)
MEAN = 4.9747 S.D. = .3635 C.S. = -.1559 C.K. = 2.7877
SAMPLE MIN = 68. SAMPLE MAX = 276. N = 29

PARAMETERS FOR GUMBEL I A = .022460 U = 129.
PARAMETERS FOR LOGNORMAL M = 4.9747 S = .3635
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -16. M = 5.0829 S = .3260
STATISTICS OF LOG(X-A)
MEAN = 5.0829 S.D. = .3260 C.S. = -.0809 C.K. = 2.7547
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0283 B = .1646E+03 LOG(M) = 9.6384
ME= .1534E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0537 B = .4453E+02
LOG(M)F= 7.3674 M = .1583E+04
DISTRIBUTION STATISTICS MEAN = 4.9747 S.D. = .3585 C.S. = -.2997

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	54.		57.		54.		52.		54.	
1.050	79.		80.		79.		78.		78.	
1.250	107.		107.		107.		108.		107.	
2.000	145.		145.		146.		147.		146.	
2.330	154.	6.92	154.	6.80	155.	7.12	157.	7.06	156.	7.27
5.000	195.	7.63	197.	7.86	197.	7.61	196.	7.15	197.	7.57
10.000	229.	8.36	231.	9.11	229.	8.97	226.	7.91	229.	8.64
20.000	261.	8.97	263.	10.40	260.	10.80	253.	9.30	259.	10.40
50.000	302.	9.62	305.	11.90	299.	13.50	285.	11.00	296.	13.20
100.000	333.	10.00	337.	13.00	329.	15.60	308.	14.00	326.	16.20
200.000	364.	10.40	369.	14.00	358.	17.70	330.	16.40	350.	19.10
500.000	405.	10.80	412.	15.30	397.	20.40	357.	19.70	385.	23.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

WABIGOON RIVER NEAR QUIBELL 05QD006
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1380.0

WANAPITEI RIVER NEAR CONISTON 02DB003

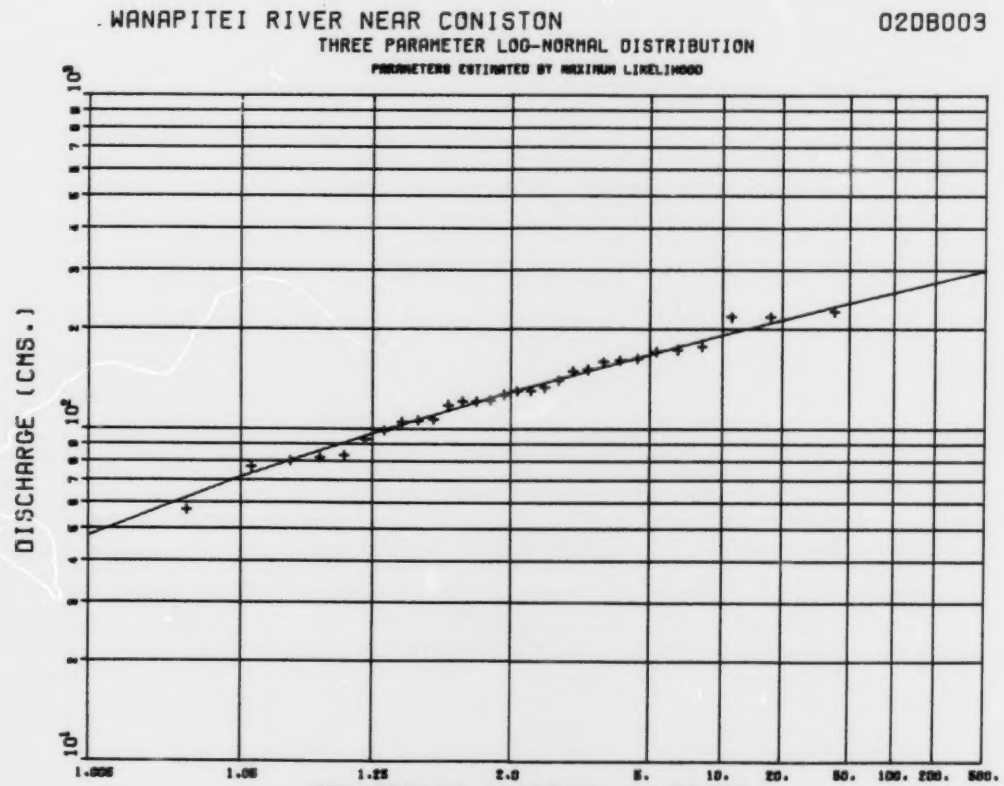
DRAINAGE AREA : 2820.8 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1923 - 1952

SAMPLE STATISTICS
MEAN = 133. S.D. = 42.8 C.S. = .4879 C.K. = 3.1854
SAMPLE STATISTICS (LOGS)
MEAN = 4.8401 S.D. = .3311 C.S. = -.2914 C.K. = 3.2232
SAMPLE MIN = 57. SAMPLE MAX = 225. N = 30

PARAMETERS FOR GUMBEL I A = .027770 U = 113.
PARAMETERS FOR LOGNORMAL M = 4.8401 S = .3311
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -54. M = 5.2064 S = .2282
STATISTICS OF LOG(X-A)
MEAN = 5.2064 S.D. = .2282 C.S. = -.0370 C.K. = 3.0026
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0482 B = .4710E+02 LOG(M) = 7.1124
ME= .1227E+04
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0663 B = .2434E+02
LOG(M)= 6.4534 M = .6348E+03
DISTRIBUTION STATISTICS MEAN = 4.8401 S.D. = .3270 C.S. = -.4054

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	53.		54.		47.		48.		49.	
1.05C	73.		73.		71.		71.		72.	
1.250	96.		96.		97.		97.		96.	
2.000	126.		126.		129.		129.		129.	
2.330	134.	6.23	134.	6.09	136.	6.25	137.	6.25	136.	6.49
5.000	167.	7.09	167.	7.04	167.	6.42	167.	6.20	168.	6.51
10.000	194.	7.83	193.	8.16	191.	7.40	189.	5.70	191.	7.25
20.000	220.	8.45	218.	9.27	212.	8.80	208.	7.73	212.	8.68
50.000	254.	9.12	250.	10.70	238.	11.90	230.	9.68	237.	11.30
100.000	279.	9.53	273.	11.60	256.	12.70	245.	11.40	254.	13.60
200.000	304.	9.89	297.	12.60	274.	14.40	260.	13.30	271.	16.00
500.000	337.	10.30	328.	13.70	298.	16.70	277.	16.00	292.	19.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I381.0

WANAPITEI RIVER NEAR WANUP 02DB005

DRAINAGE AREA = 3130.0 SQ. KM.
REGULATED FLOW = CLASS 3
PERIOD OF RECORD = 1953 - 1982

SAMPLE STATISTICS MEAN = 165. S.D. = 66.3 C.S. = .9766 C.K. = 3.7886
SAMPLE STATISTICS (LOGS) MEAN = 5.0348 S.D. = .3904 C.S. = .0877 C.K. = 3.4491
SAMPLE MIN = 67. SAMPLE MAX = 326. N = 30

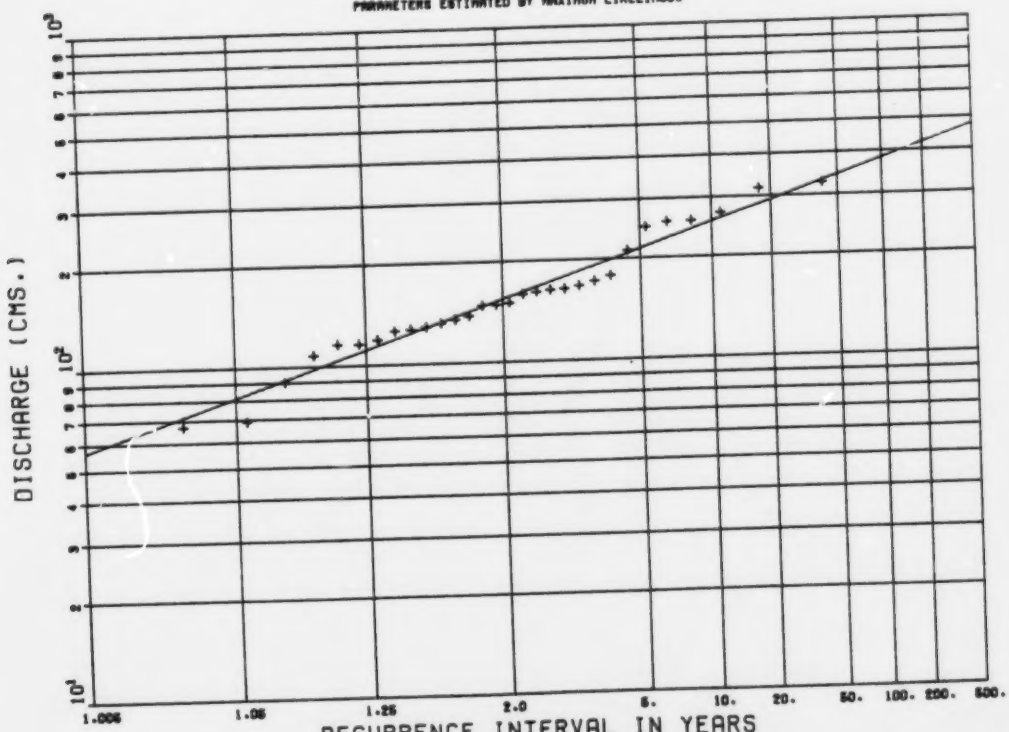
PARAMETERS FOR GUMBEL I A = .020130 U = 136.
PARAMETERS FOR LOGNORMAL M = 5.0348 S = .3904
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 2. M = 5.0239 S = .3946
STATISTICS OF LOG(X-A) MEAN = 5.0239 S.D. = .3946 C.S. = -.0053 C.K. = 3.4599
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .8015 B = .6694E+05 LOG(M) = ******** ME= .2108E-41

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	MAX. LIKELIHOOD F.E.	MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	53.		56.		57.		0.		56.	
1.050	81.		81.		81.		0.		81.	
1.250	112.		111.		111.		0.		111.	
2.000	154.		154.		154.		0.		154.	
2.330	165.	6.98	165.	7.18	165.	7.60	0.	0.00	165.	7.72
5.000	211.	7.76	213.	8.29	213.	8.33	0.	0.00	213.	8.36
10.000	248.	8.46	253.	9.62	254.	9.54	0.	0.00	254.	9.83
20.000	284.	9.04	292.	10.90	292.	12.00	0.	0.00	292.	12.10
50.000	330.	9.67	343.	12.60	343.	15.80	0.	0.00	343.	15.70
100.000	365.	10.10	383.	13.70	382.	17.30	0.	0.00	382.	18.90
200.000	399.	10.40	420.	14.80	422.	19.60	0.	0.00	421.	22.20
500.000	445.	10.70	473.	16.20	475.	22.70	0.	0.00	475.	26.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

02DB005



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1382.0

WATABEAG RIVER WATABEAG LAKE DAM 04MB003

DRAINAGE AREA : 238.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1955 - 1982

SAMPLE STATISTICS
MEAN = 18. S.D. = 12.7 C.S. = 4.1242 C.K. = 22.8721
SAMPLE STATISTICS (LOGS)
MEAN = 2.7681 S.D. = .4368 C.S. = 1.7224 C.K. = 8.9744
SAMPLE MIN = 8. SAMPLE MAX = 78. N = 28

PARAMETERS FOR GUMBEL I A = .184717 U = 14.
PARAMETERS FOR LOGNORMAL M = 2.7681 S = .4368
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 7. M = 2.1310 S = .7415
STATISTICS OF LOG(X-A)
MEAN = 2.1310 S.D. = .7415 C.S. = .2928 C.K. = 5.4722
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .3762 B = .1348E+01 LOG(M) = 2.2609
ME= .9592E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1873 B = .4774E+01
LOG(M)F= 1.8738 M = .6513E+01
DISTRIBUTION STATISTICS MEAN = 2.7681 S.D. = .4093 C.S. = .9154

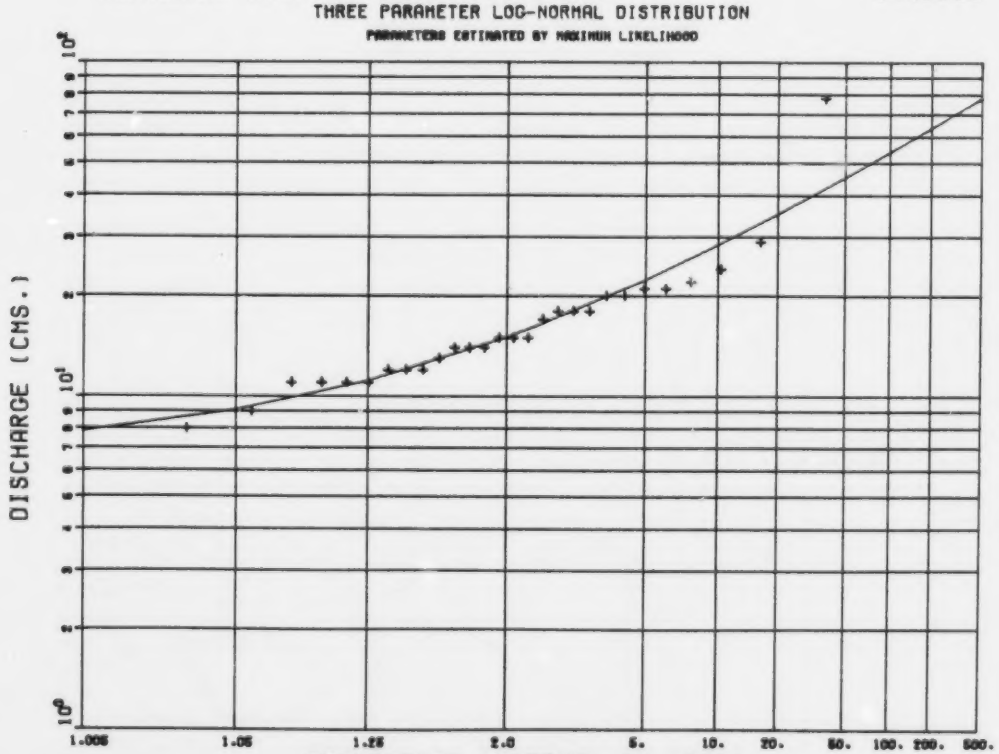
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	5.		5.		8.		8.		0.	
1.050	9.		8.		9.		9.		0.	
1.250	12.		12.		11.		11.		0.	
2.000	16.		16.		15.		15.		0.	
2.330	17.	7.51	17.	8.32	16.	8.67	16.	8.12	0.	0.00
5.000	22.	8.28	23.	9.61	22.	11.50	22.	11.20	0.	0.00
10.000	26.	8.98	28.	11.10	28.	14.50	28.	14.60	0.	0.00
20.000	30.	9.57	33.	12.70	35.	18.70	34.	18.90	0.	0.00
50.000	35.	10.20	39.	14.60	45.	25.70	44.	25.10	0.	0.00
100.000	39.	10.60	44.	15.90	54.	32.40	54.	30.10	0.	0.00
200.000	43.	10.90	49.	17.20	64.	41.00	65.	35.30	0.	0.00
500.000	48.	11.30	56.	18.70	78.	55.60	83.	42.50	0.	0.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

WATABEAG RIVER WATABEAG LAKE DAM 04MB003

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I383.0

WAUBUNO CREEK NEAR DORCHESTER 02GD020

DRAINAGE AREA = 108.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

SAMPLE STATISTICS
MEAN = 38. S.D. = 14.9 C.S. = .7604 C.K. = 3.9912
SAMPLE STATISTICS (LOGS)
MEAN = 3.5731 S.D. = .3979 C.S. = -.2468 C.K. = 3.8719
SAMPLE MIN = 15. SAMPLE MAX = 70. N = 17

PARAMETERS FOR GUMBEL I A = .084890 U = 32.
PARAMETERS FOR LOGNORMAL M = 3.5731 S = .3979
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -8. M = 3.7807 S = .3222
STATISTICS OF LOG(X-A)
MEAN = 3.7807 S.D. = .3222 C.S. = -.0355 C.K. = 3.6672
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0491 B = .6569E+02 LOG(M) = 6.7978
ME= .8959E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0557 B = .4810E+02
LOG(M)F= 6.2546 M = .5204E+03
DISTRIBUTION STATISTICS MEAN = 3.5731 S.D. = .3866 C.S. = -.2884

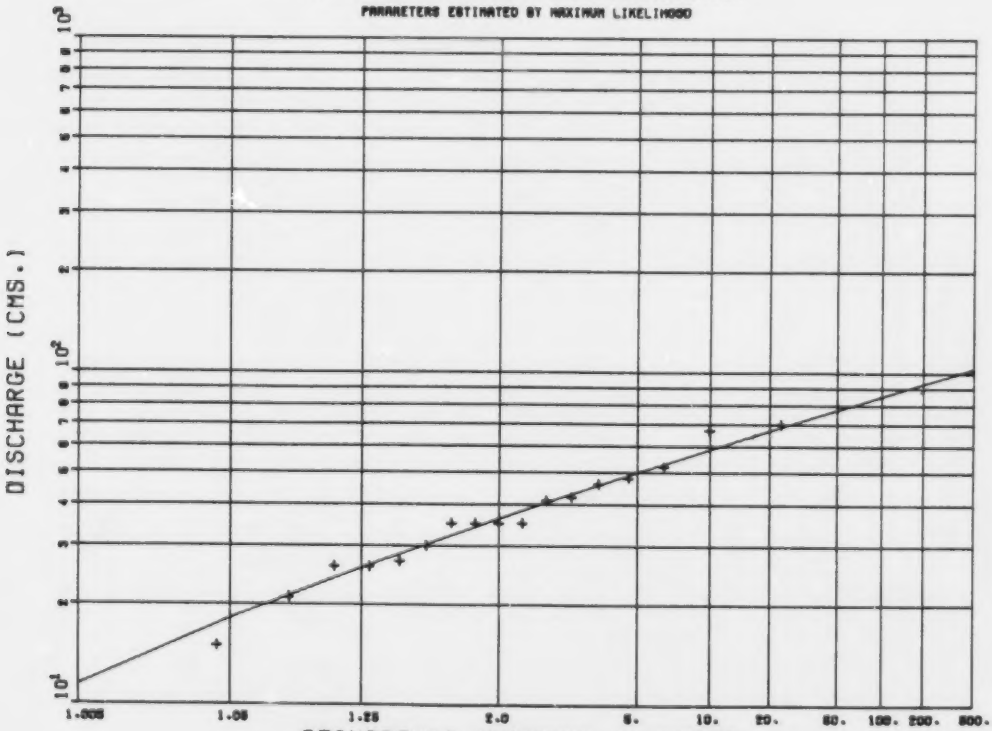
	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	12.		13.		11.		12.		12.	
1.050	19.		19.		18.		18.		18.	
1.250	26.		26.		26.		26.		26.	
2.000	36.		36.		36.		36.		36.	
2.330	38.	9.45	38.	9.73	39.	10.00	39.	9.95	39.	10.40
5.000	49.	10.50	50.	11.20	50.	10.50	50.	10.10	52.	10.50
10.000	58.	11.40	59.	13.00	59.	12.30	58.	11.20	59.	11.80
20.000	67.	12.10	69.	14.80	67.	14.60	65.	13.20	67.	14.20
50.000	78.	13.00	81.	17.00	77.	18.20	74.	16.80	77.	18.40
100.000	86.	13.50	90.	18.60	85.	20.90	81.	20.00	84.	22.10
200.000	94.	13.90	99.	20.10	93.	23.70	87.	23.30	91.	26.10
500.000	105.	14.40	112.	21.90	103.	27.30	95.	28.10	101.	31.50

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

WAUBUNO CREEK NEAR DORCHESTER 02GD020

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I384.0

WELLAND RIVER BELOW CAISTOR CORNERS 02HA007

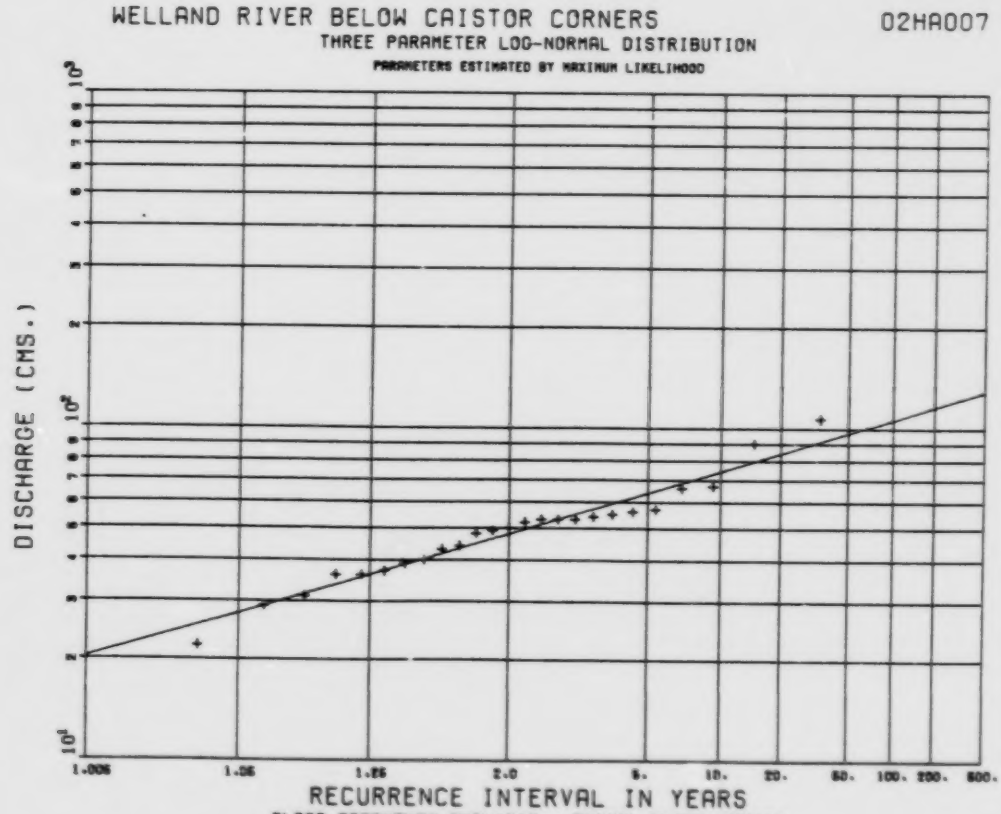
DRAINAGE AREA : 230.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1958 - 1982

SAMPLE STATISTICS
MEAN = 51. S.D. = 18.3 C.S. = 1.4449 C.K. = 6.6486
SAMPLE STATISTICS (LOGS)
MEAN = 3.8695 S.D. = .3389 C.S. = .1104 C.K. = 4.4113
SAMPLE MIN = 22. SAMPLE MAX = 107. N = 25

PARAMETERS FOR GUMBEL I A = .073853 U = 43.
PARAMETERS FOR LOGNORMAL M = 3.8695 S = .3389
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 3.8365 S = .3503
STATISTICS OF LOG(X-A)
MEAN = 3.8365 S.D. = .3503 C.S. = .0656 C.K. = 4.4128
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .0187 B = .3280E+03 LOG(M) =-2.2690
ME= .1034E+00
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0121 B = .7517E+03
LOG(M)= -5.2335 M = .5335E-02
DISTRIBUTION STATISTICS MEAN = 3.8695 S.D. = .3320 C.S. = .0729

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	20.		20.		20.		21.		21.	
1.050	28.		27.		28.		28.		28.	
1.250	36.		36.		36.		36.		36.	
2.000	48.		48.		48.		48.		48.	
2.330	51.	6.78	51.	6.83	51.	7.26	51.	7.21	51.	7.38
5.000	63.	7.72	64.	7.89	64.	7.97	63.	7.92	64.	8.16
10.000	73.	8.54	74.	9.15	74.	9.52	74.	9.43	74.	9.79
20.000	83.	9.22	84.	10.40	84.	11.50	83.	11.60	85.	12.10
50.000	96.	9.95	96.	12.00	97.	14.50	96.	15.30	98.	16.00
100.000	105.	10.40	105.	13.00	106.	16.80	106.	18.30	108.	19.20
200.000	115.	10.80	115.	14.10	116.	19.20	115.	21.60	119.	22.70
500.000	127.	11.20	127.	15.40	129.	22.30	128.	26.10	133.	27.40

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I385.0

WEST DUFFINS CREEK AT GREEN RIVER 02HC026

DRAINAGE AREA = 38.1 SQ. KM.
REGULATED FLOW = CLASS 1
PERIOD OF RECORD = 1964 - 1982

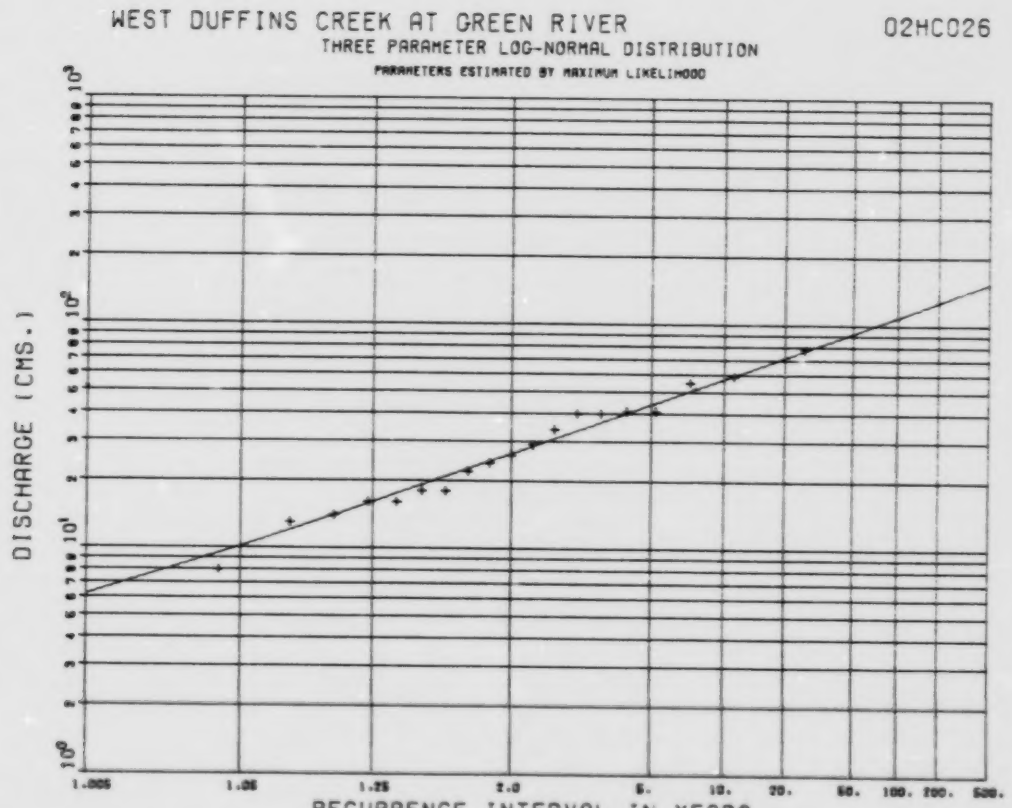
SAMPLE STATISTICS
MEAN = 31. S.D. = 18.3 C.S. = 1.0634 C.K. = 4.4481
SAMPLE STATISTICS (LOGS)
MEAN = 3.2777 S.D. = .5931 C.S. = -.0739 C.K. = 3.0386
SAMPLE MIN = 9. SAMPLE MAX = 78. N = 19

PARAMETERS FOR GUMBEL I A = .070868 U = 23.
PARAMETERS FOR LOGNORMAL P = 3.2777 S = .5931
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 1. M = 3.2262 S = .6242
STATISTICS OF LOG(X-A)
MEAN = 3.2262 S.D. = .6242 C.S. = -.1403 C.K. = 3.1141
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0219 B = .7353E+03 LOG(P) =19.3604
ME= .2559E+09
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0431 B = .1798E+03
LOG(P)F=11.3259 M = .6144E+05

DISTRIBUTION STATISTICS MEAN = 3.2777 S.D. = .5779 C.S. = -.1492

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	1.		6.		6.		6.		6.	
1.050	6.		10.		13.		10.		11.	
1.250	17.		16.		16.		16.		16.	
2.000	28.		27.		26.		27.		27.	
2.330	31.	12.30	30.	13.70	29.	14.50	30.	14.20	30.	14.70
5.000	43.	12.60	44.	15.90	44.	16.20	43.	14.90	44.	15.60
10.000	52.	13.20	57.	18.40	57.	19.50	55.	17.00	56.	18.10
20.000	62.	13.70	70.	20.90	71.	21.30	67.	20.50	70.	22.00
50.000	74.	14.20	90.	24.00	93.	28.50	83.	26.40	89.	28.60
100.000	83.	14.50	105.	26.20	109.	32.40	95.	31.50	102.	34.20
200.000	92.	14.80	122.	28.30	127.	36.20	108.	37.00	117.	40.30
500.000	104.	15.10	146.	30.90	153.	41.10	126.	44.60	139.	48.60

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I386.0

WEST HUMBER RIVER AT HIGHWAY NO.7 02HC031

DRAINAGE AREA = 148.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD = 1966 - 1982

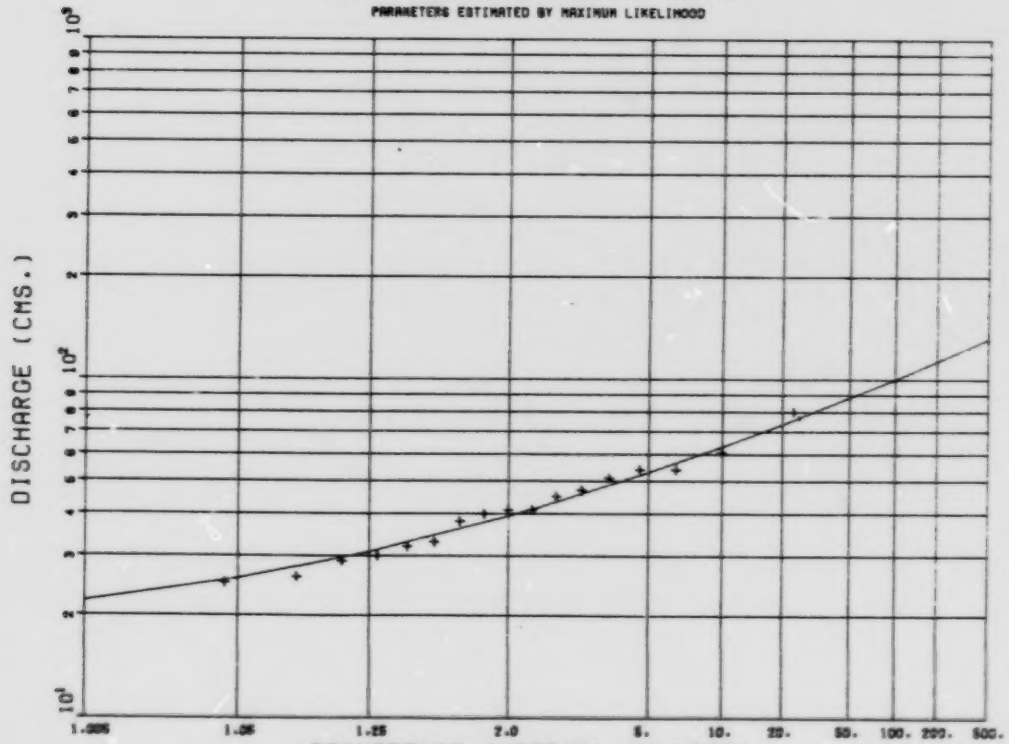
SAMPLE STATISTICS
MEAN = 43. S.D. = 14.3 C.S. = 1.0484 C.K. = 5.1224
SAMPLE STATISTICS (LOGS)
MEAN = 3.7071 S.D. = .3177 C.S. = .2977 C.K. = 3.3485
SAMPLE MIN = 25. SAMPLE MAX = 90. N = 17

PARAMETERS FOR GUMBEL I A = .035393 U = 37.
PARAMETERS FOR LOGNORMAL M = 3.7071 S = .3177
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 17. M = 3.1199 S = .5607
STATISTICS OF LOG(X-A)
MEAN = 3.1199 S.D. = .5607 C.S. = -.1689 C.K. = 3.0950
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .3473 B = .4514E+02 LOG(M) = 1.5725
ME= .4819E+01
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .1073 B = .8675E+01
LOG(M)F= 2.7759 M = .1525E+02
DISTRIBUTION STATISTICS MEAN = 3.7071 S.D. = .3161 C.S. = .6790

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD LOG PEARSON III		MOMENTS LOG PEARSON III	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	19.		18.		22.		22.		21.	
1.050	25.		24.		26.		26.		25.	
1.250	32.		31.		31.		31.		31.	
2.000	40.		41.		39.		39.		40.	
2.330	43.	7.58	43.	7.77	42.	8.60	42.	8.21	42.	8.50
5.000	52.	8.77	53.	8.97	51.	10.80	52.	10.50	53.	9.71
10.000	60.	9.78	61.	10.40	63.	13.60	62.	13.60	62.	12.00
20.000	68.	10.60	69.	11.80	74.	17.50	72.	17.40	71.	15.30
50.000	77.	11.60	78.	13.60	88.	22.50	87.	23.20	82.	20.50
100.000	85.	12.10	85.	14.80	100.	26.30	99.	27.80	91.	24.90
200.000	92.	12.60	92.	16.00	113.	30.10	112.	32.90	101.	29.50
500.000	102.	13.20	102.	17.50	131.	35.10	132.	39.60	114.	36.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT

WEST HUMBER RIVER AT HIGHWAY NO.7 02HC031
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1387.0

WEST HUMBER RIVER BELOW CLAIREVILLE DAM 02HC034

DRAINAGE AREA : 104.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1966 - 1981

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	49.	13.	-.261	4.113
LN X SERIES	3.86	.24	-1.020	5.375

X(MIN)= 23. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 72. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

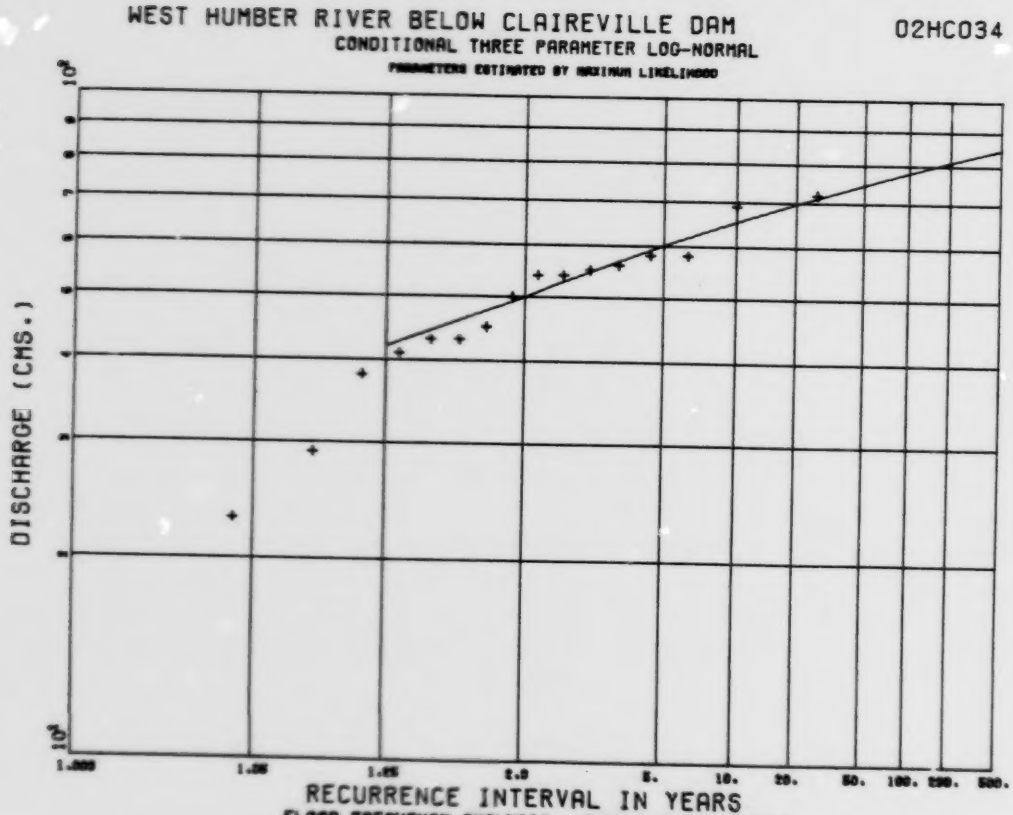
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	51.	11.	.061	4.163
LN X SERIES	3.91	.24	-.588	4.864
LN (X-A) SERIES	6.31	.02	-.003	4.170

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -498.0899 M = 6.3081 S = .0209

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	42.
2.000	.500	50.
3.333	.429	52.
5.000	.200	60.
10.000	.100	65.
20.000	.050	70.
50.000	.020	75.
100.000	.010	78.
200.000	.005	81.
500.000	.002	85.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I388.0

WEST MONTREAL RIVER AT MISTINIKON LAKE DAM 02JD012

DRAINAGE AREA : 1780.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1946 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	142.	60.	1.215	5.175
LN X SERIES	4.87	.41	-.149	4.265

X(MIN)= 40. CMS. TOTAL SAMPLE SIZE= 37
X(MAX)= 320. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	144.	58.	1.357	5.357
LN X SERIES	4.90	.37	.499	3.042
LN (X-A) SERIES	4.16	.73	-.191	2.815

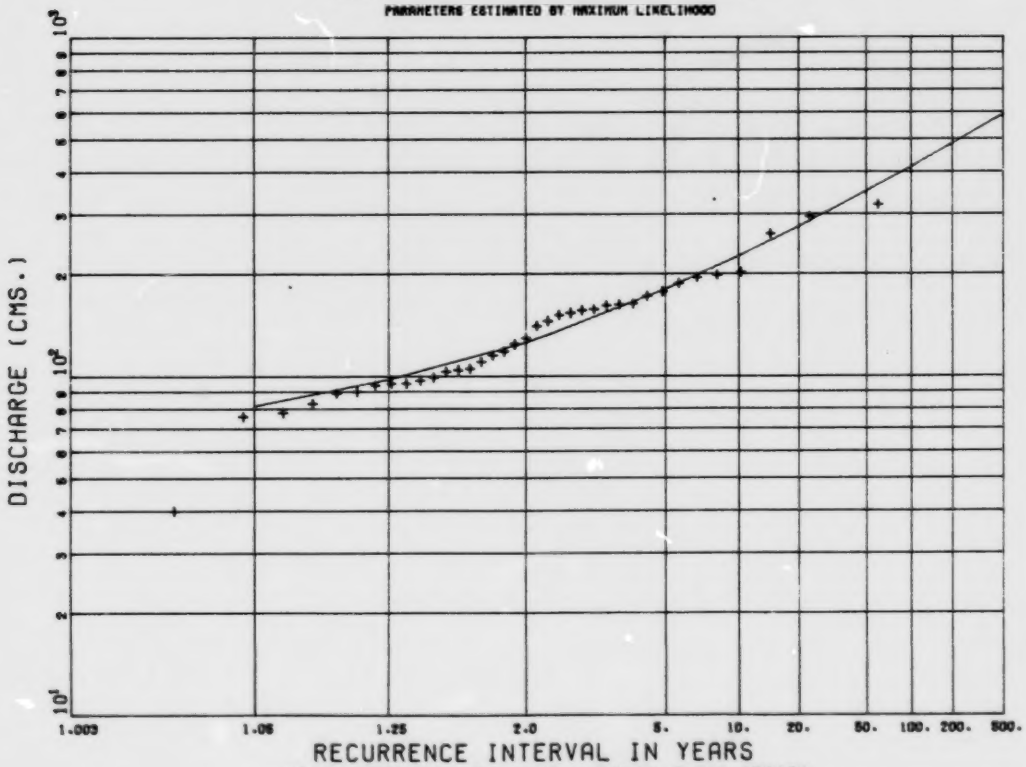
CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 62.3493 M = 4.1631 S = .7328

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	81.
1.250	.800	98.
2.000	.500	125.
2.330	.429	134.
5.000	.200	180.
10.000	.100	225.
20.000	.050	275.
50.000	.020	350.
100.000	.010	413.
200.000	.005	484.
500.000	.002	599.

WEST MONTREAL RIVER AT MISTINIKON LAKE DAM 02JD012
CONDITIONAL THREE PARAMETER LOG-NORMAL
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I389.0

WHITE RIVER BELOW WHITE LAKE 02BC004

DRAINAGE AREA : 4170.0 SQ. KM.
REGULATED FLOW : CLASS 3
PERIOD OF RECORD : 1960 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	234.	71.	.452	6.344
LN X SERIES	5.40	.36	-1.906	11.605

X(MIN)= 60. CMS. TOTAL SAMPLE SIZE= 23
X(MAX)= 429. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	242.	62.	1.494	6.582
LN X SERIES	5.46	.23	.855	4.500
LN (X-A) SERIES	4.50	.56	-.034	3.854

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 137.8612 M = 4.4972 S = .5648

FLOOD FREQUENCY REGIME

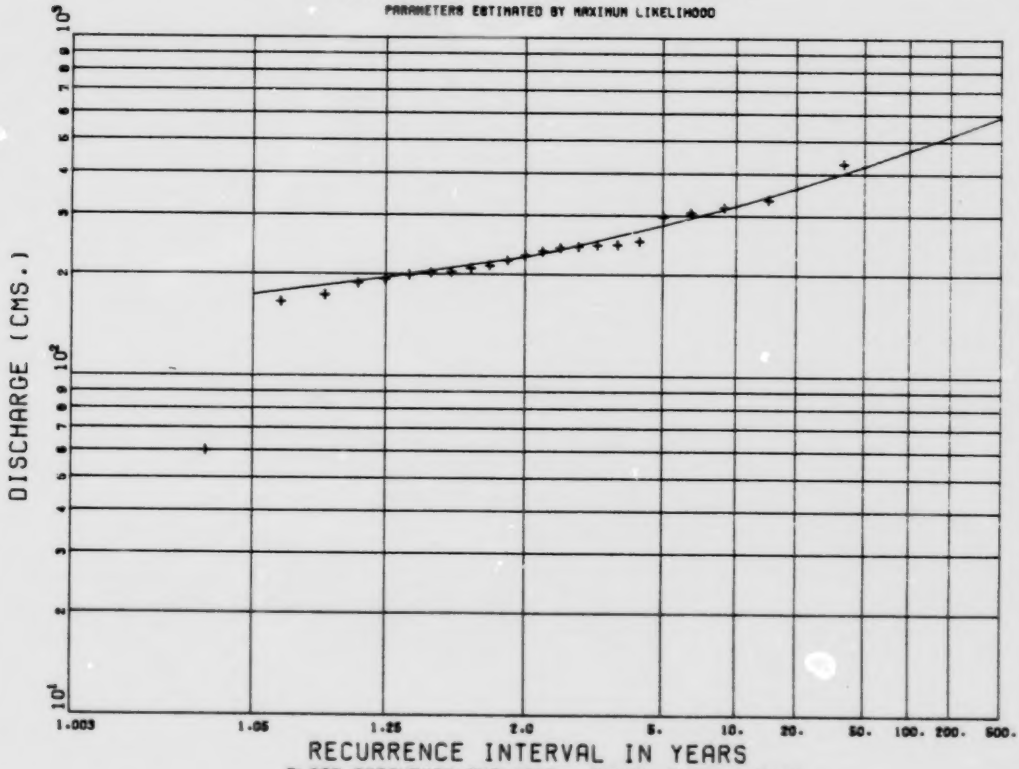
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	173.
1.250	.800	195.
2.000	.500	226.
2.330	.429	234.
5.000	.200	290.
10.000	.100	329.
20.000	.050	362.
50.000	.020	421.
100.000	.010	469.
200.000	.005	513.
500.000	.002	591.

WHITE RIVER BELOW WHITE LAKE 02BC004

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

FIGURE : I390.0

WHITEMANS CREEK NEAR MOUNT VERNON 02GB008

DRAINAGE AREA : 383.0 SQ. KM.
REGULATED FLOW : CLASS 1
PERIOD OF RECORD : 1962 - 1982

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	55.	19.	-.118	3.566
LN X SERIES	3.94	.43	-1.325	6.253

X(MIN)= 15. CMS. TOTAL SAMPLE SIZE= 21
X(MAX)= 92. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

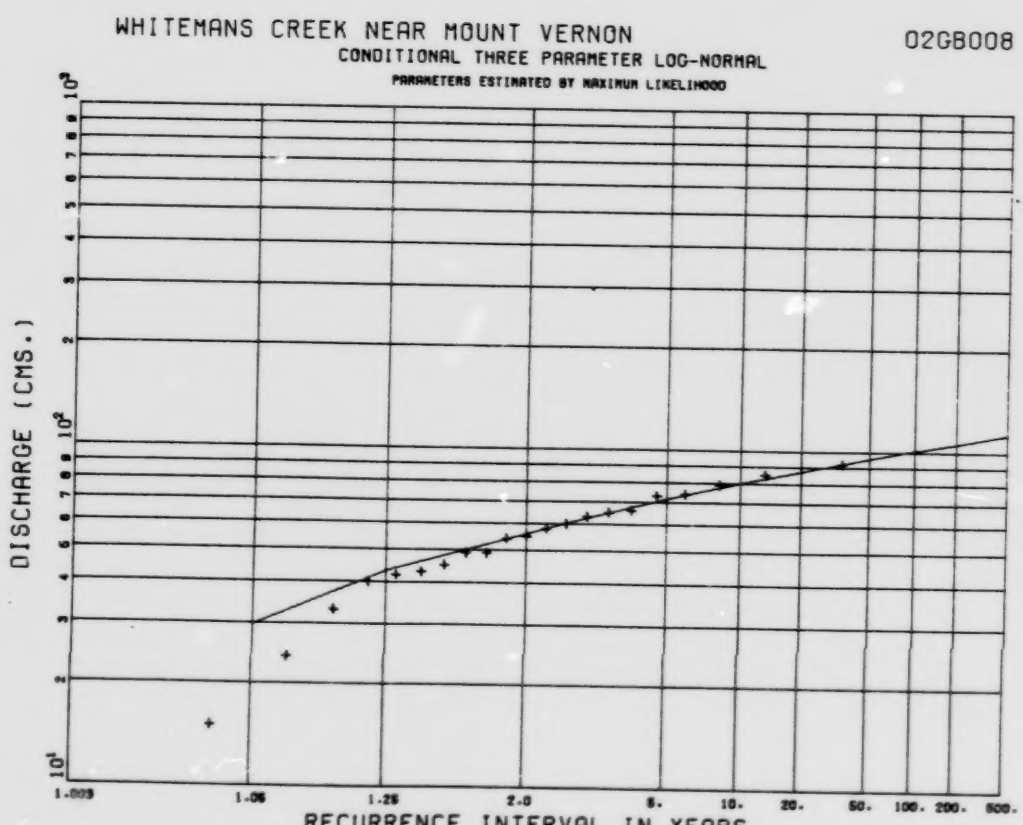
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	57.	18.	.155	3.395
LN X SERIES	4.00	.33	-.670	4.427
LN (X-A) SERIES	5.45	.06	-.015	3.422

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -176.5740 M = 5.4527 S = .0752

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	30.
1.250	.800	43.
2.000	.500	56.
2.330	.429	59.
5.000	.200	71.
10.000	.100	80.
20.000	.050	87.
50.000	.020	95.
100.000	.010	101.
200.000	.005	106.
500.000	.002	113.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1391.0

WHITSON RIVER AT CHELMSFORD 02CF007

DRAINAGE AREA : 272.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1962 - 1982

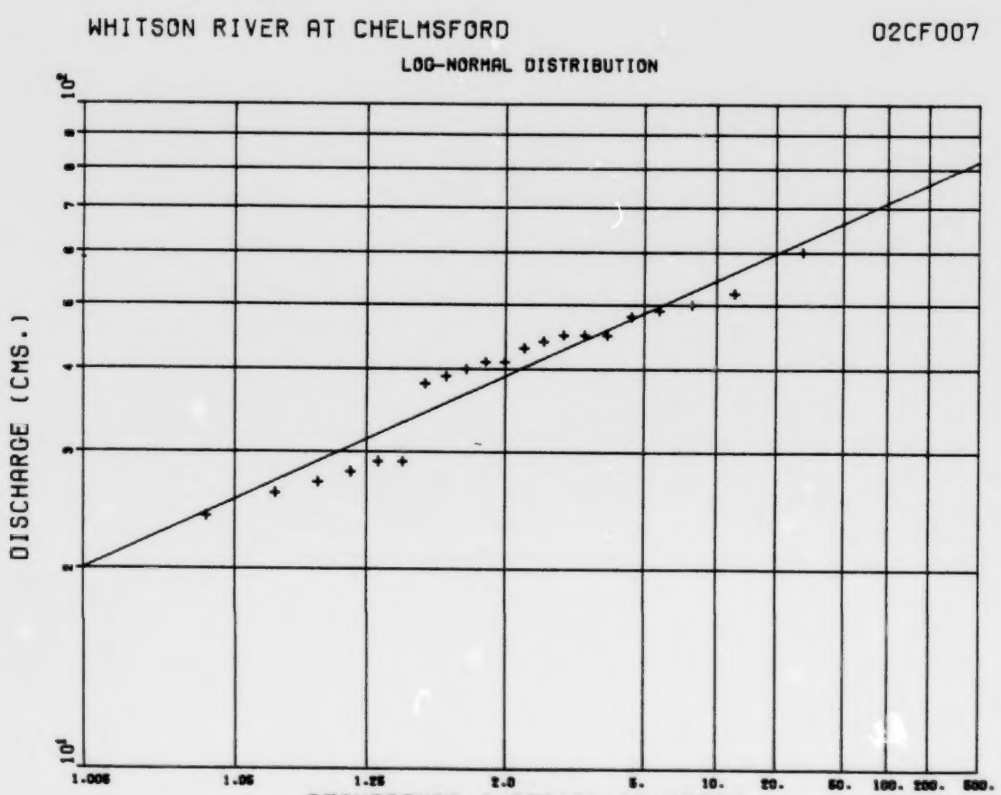
SAMPLE STATISTICS
MEAN = 40. S.D. = 9.8 C.S. = -.1181 C.K. = 2.8882
SAMPLE STATISTICS (LOGS)
MEAN = 3.6620 S.D. = .2586 C.S. = -.5152 C.K. = 2.6957
SAMPLE MIN = 24. SAMPLE MAX = 60. N = 21

PARAMETERS FOR GUMBEL I A = .111542 U = 35.
PARAMETERS FOR LOGNORMAL M = 3.6620 S = .2586

NO MOMENT SOLUTION FOR THREE PARAMETER LOGNORMAL
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8666 B = .1507E+02 LOG(M) = 4.6659
ME= .1063E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1083 B = .5620E+01
LOG(M)E= 4.2704 M = .7155E+02
DISTRIBUTION STATISTICS MEAN = 3.6620 S.D. = .2567 C.S. = -.8437

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		LOG PEARSON III MAX. LIKELIHOOD		LOG PEARSON III MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	20.		20.		0.		16.		18.	
1.050	25.		25.		0.		24.		25.	
1.250	31.		31.		0.		32.		32.	
2.000	39.		39.		0.		40.		40.	
2.330	41.	6.12	41.	5.69	0.	0.00	42.	5.44	42.	6.07
5.000	49.	7.23	48.	6.57	0.	0.00	49.	4.93	49.	5.66
10.000	56.	8.15	54.	7.62	0.	0.00	52.	4.80	53.	6.06
20.000	62.	8.93	60.	8.66	0.	0.00	55.	4.96	57.	7.30
50.000	70.	9.79	66.	9.95	0.	0.00	59.	5.59	62.	9.77
100.000	77.	10.30	71.	10.90	0.	0.00	60.	6.30	64.	11.90
200.000	83.	10.80	76.	11.70	0.	0.00	62.	7.13	67.	14.20
500.000	91.	11.30	82.	12.80	0.	0.00	64.	8.33	70.	17.40

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I392.0

WILLOW CREEK ABOVE LITTLE LAKE 02ED009

DRAINAGE AREA 95.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1973 - 1983

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	25.	8.	-.378	3.224
LN X SERIES	3.14	.41	-1.314	3.562

X(MIN)= 8. CMS. TOTAL SAMPLE SIZE= 11
X(MAX)= 35. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	26.	6.	-.338	3.252
LN X SERIES	3.24	.23	-.853	3.235
LN (X-A) SERIES	3.53	.16	-.036	3.213

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = 60.6065 P = 3.5265 S = .1515

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKELIHOOD)

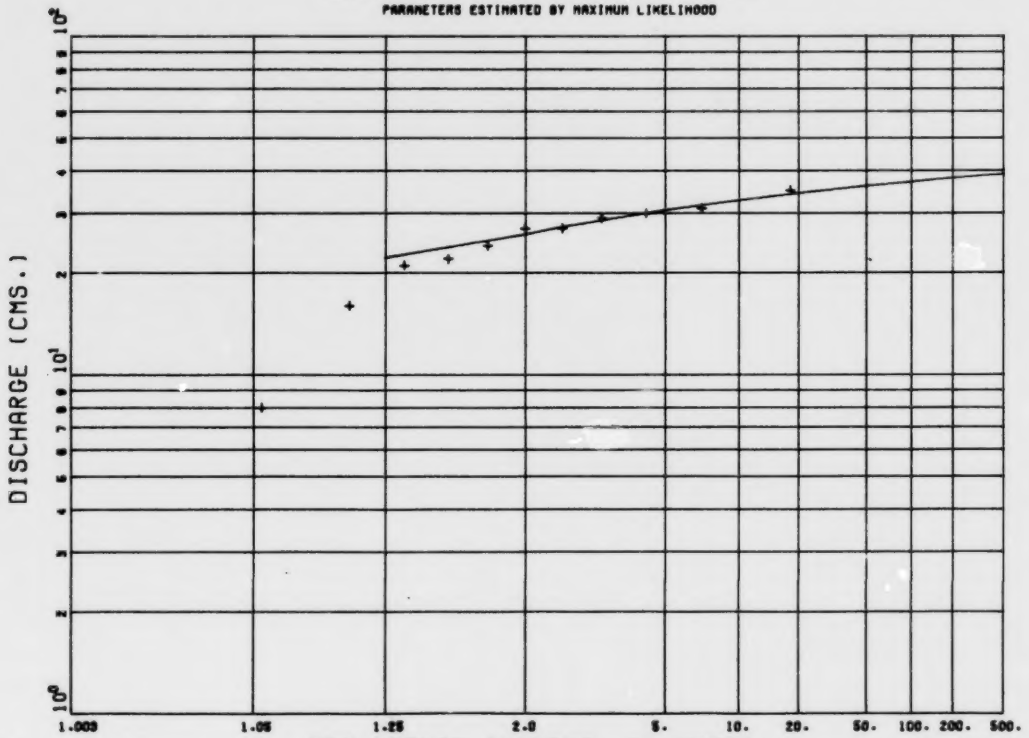
RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	22.
2.000	.500	29.
2.330	.429	27.
5.000	.200	31.
10.000	.100	33.
20.000	.050	34.
50.000	.020	36.
100.000	.010	37.
200.000	.005	38.
500.000	.002	39.

DATA REVISED

WILLOW CREEK ABOVE LITTLE LAKE 02ED009

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE 1393.0

WILLOW CREEK AT MIDHURST 02ED010

DRAINAGE AREA : 127.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1973 - 1982

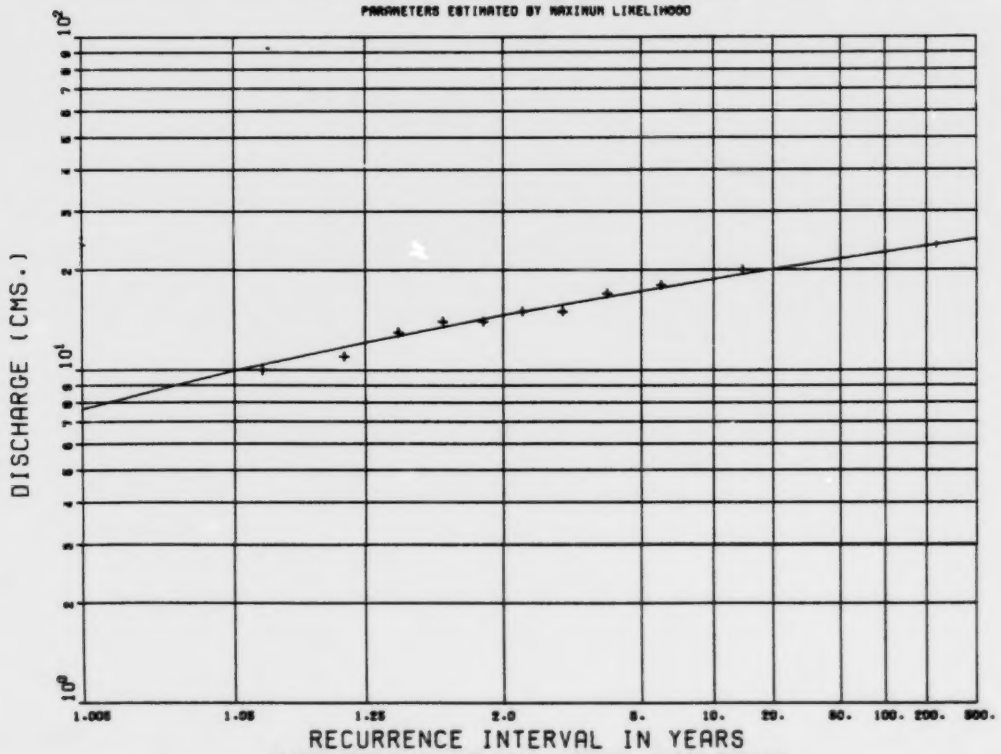
SAMPLE STATISTICS
MEAN = 15. S.D. = 3.1 C.S. = .1797 C.K. = 4.0489
SAMPLE STATISTICS (LOGS)
MEAN = 2.6679 S.D. = .2124 C.S. = -.2706 C.K. = 4.0717
SAMPLE MIN = 10. SAMPLE MAX = 20. N = 10

PARAMETERS FOR GUMBEL I A = .380785 U = 13.
PARAMETERS FOR LOGNORMAL M = 2.6679 S = .2124
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -17. M = 3.4492 S = .0968
STATISTICS OF LOG(X-A)
MEAN = 3.4492 S.D. = .0968 C.S. = -.8268 C.K. = 4.0822
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0287 B = .5461E+02 LOG(M) = 4.2377
ME= .6925E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.0505 B = .1628E+02
LOG(M)F= 3.4901 M = .3279E+02
DISTRIBUTION STATISTICS MEAN = 2.6679 S.D. = .2038 C.S. = -.4957

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	9.		8.		8.		8.		8.	
1.050	10.		10.		10.		10.		10.	
1.250	12.		12.		12.		12.		12.	
2.000	14.		14.		15.		15.		15.	
2.330	15.	7.12	15.	6.77	15.	7.00	15.	6.67	15.	7.22
5.000	17.	8.69	17.	7.82	17.	7.08	17.	6.49	17.	7.28
10.000	19.	10.00	19.	9.07	19.	8.03	19.	6.87	19.	8.14
20.000	21.	11.10	20.	10.30	20.	9.52	20.	7.78	20.	9.75
50.000	24.	12.40	22.	11.80	22.	11.90	21.	9.61	22.	12.70
100.000	25.	13.20	24.	12.90	23.	13.80	22.	11.30	23.	15.24
200.000	27.	14.00	25.	14.00	24.	15.80	22.	13.10	24.	18.80
500.000	30.	14.80	27.	15.20	25.	18.50	23.	15.60	25.	21.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

WILLOW CREEK AT MIDHURST 02ED010
THREE PARAMETER LOG-NORMAL DISTRIBUTION
PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I394.0

WILMOT CREEK NEAR KIRBY 02HD232

NOTE: ALL DATA VALUES SHOWN ARE MULTIPLIED BY A FACTOR OF 100
----- (PARAMETERS C.S. , C.K. AND S.E.P. NOT AFFECTED)

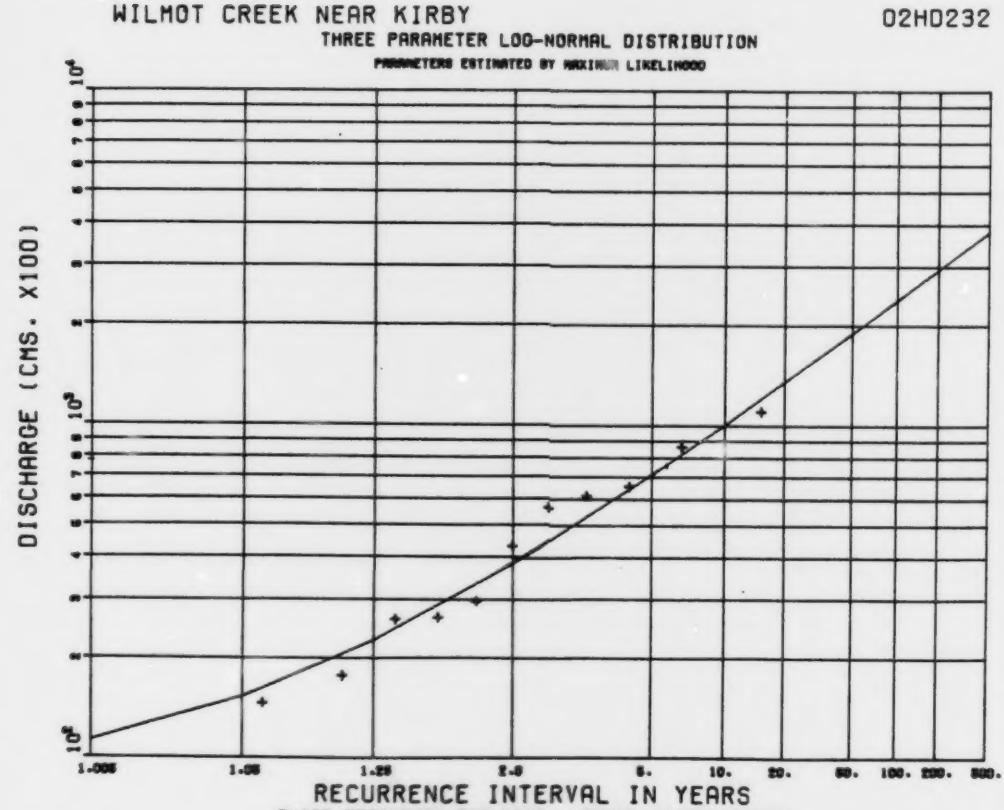
DRAINAGE AREA : 27.2 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1976

SAMPLE STATISTICS
MEAN = 489. S.D. = 304.2 C.S. = .8320 C.K. = 4.1526
SAMPLE STATISTICS (LOGS)
MEAN = 6.0057 S.D. = .6555 C.S. = -.0805 C.K. = 3.0483
SAMPLE MIN = 146. SAMPLE MAX = 1104. N = 11

PARAMETERS FOR GUMBEL I A = .004565 U = 355.
PARAMETERS FOR LOGNORMAL M = 6.0057 S = .6555
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 79. M = 5.7146 S = .8693
STATISTICS OF LOG(X-A)
MEAN = 5.7146 S.D. = .8693 C.S. = -.3737 C.K. = 3.3333
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0264 B = .6167E+03 LOG(M) =22.2839
ME= .4762E+10
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.1535 B = .1715E+02
LOG(M)F= 8.6377 M = .5640E+04
DISTRIBUTION STATISTICS MEAN = 6.0057 S.D. = .6355 C.S. = -.4829

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	-10.		75.		112.		59.		71.	
1.050	111.		138.		152.		132.		136.	
1.250	251.		234.		225.		243.		234.	
2.000	435.		406.		383.		427.		409.	
2.330	482.	17.40	456.	19.90	433.	22.20	477.	19.90	460.	21.30
5.000	684.	17.40	705.	23.00	710.	27.10	699.	19.40	706.	22.60
10.000	848.	18.00	940.	26.70	1000.	33.40	890.	20.60	935.	26.20
20.000	1010.	18.60	1190.	30.30	1350.	40.10	1050.	23.40	1170.	31.80
50.000	1210.	19.20	1560.	34.90	1890.	48.80	1260.	28.90	1520.	41.40
100.000	1360.	19.60	1860.	38.00	2370.	55.00	1420.	34.00	1790.	49.50
200.000	1520.	19.90	2200.	41.10	2930.	61.00	1570.	39.50	2090.	58.20
500.000	1720.	20.30	2680.	44.80	3790.	68.50	1760.	47.20	2510.	70.30

F.E.= FLOOD ESTIMATE(CMS X100)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I395.0

WILMOT CREEK NEAR NEWCASTLE 02HD009

DRAINAGE AREA : 82.6 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1966 - 1982

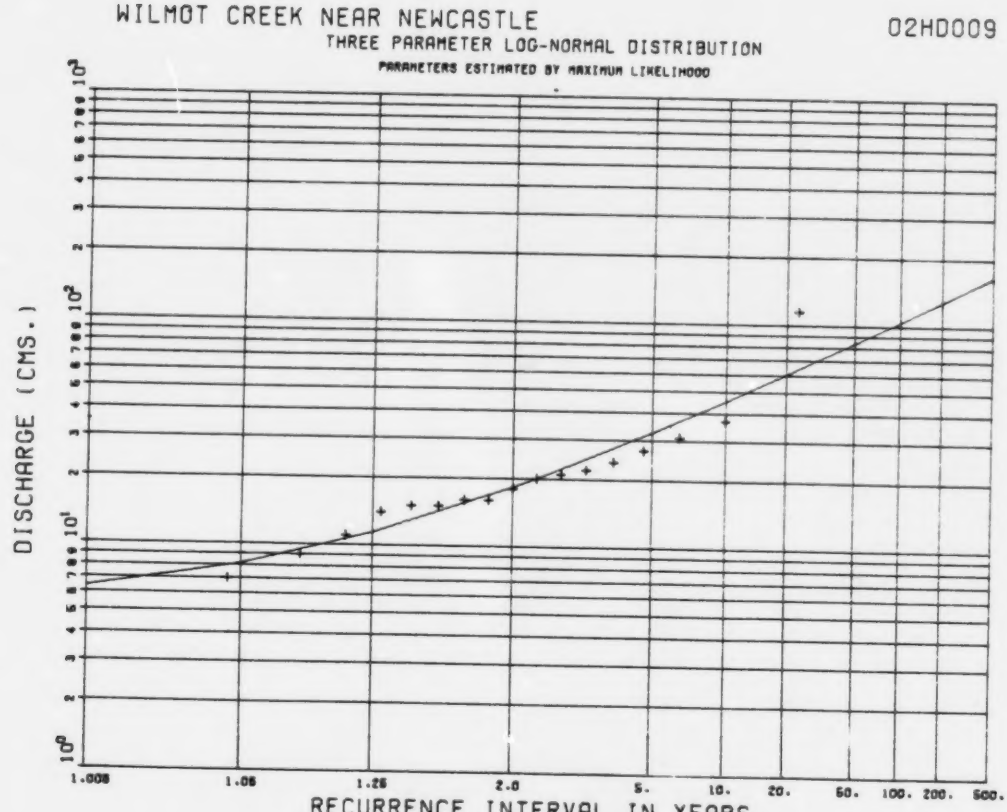
SAMPLE STATISTICS
MEAN = 29. S.D. = 24.5 C.S. = 3.4717 C.K. = 16.8277
SAMPLE STATISTICS (LOGS)
MEAN = 2.9663 S.D. = .6250 C.S. = 1.2356 C.K. = 7.0436
SAMPLE MIN = 7. SAMPLE MAX = 115. N = 17

PARAMETERS FOR GUMBEL I A = .038244 U = 17.
PARAMETERS FOR LOGNORMAL M = 2.9663 S = .6250
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 5. M = 2.5874 S = .8650
STATISTICS OF LOG(X-A)
MEAN = 2.5874 S.D. = .8650 C.S. = .2330 C.K. = 5.6662
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .3862 B = .2620E+01 LOG(M) = 1.9546

PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD ME= .7061E+01
A = .2144 B = .7653E+01
LOG(M)E= 1.3252 M = .3763E+01
DISTRIBUTION STATISTICS MEAN = 2.9663 S.D. = .5932 C.S. = .7230

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	0.		4.		6.		6.		0.	
1.050	6.		7.		8.		8.		0.	
1.250	12.		12.		11.		12.		0.	
2.000	21.		19.		18.		18.		0.	
2.330	23.	13.60	22.	15.30	20.	16.50	20.	15.40	0.	0.00
5.000	32.	13.80	33.	17.60	32.	20.70	31.	19.80	0.	0.00
10.000	40.	14.30	43.	20.50	45.	25.50	43.	25.80	0.	0.00
20.000	47.	14.80	54.	23.30	60.	31.30	57.	33.10	0.	0.00
50.000	57.	15.30	70.	26.70	83.	38.40	81.	44.10	0.	0.00
100.000	64.	15.60	83.	29.20	104.	43.40	105.	53.60	0.	0.00
200.000	71.	15.90	97.	31.50	124.	48.30	134.	62.30	0.	0.00
500.000	80.	16.20	117.	34.40	155.	54.40	183.	75.20	0.	0.00

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I396.0

WILTON CREEK NEAR NAPANEE 02HM004

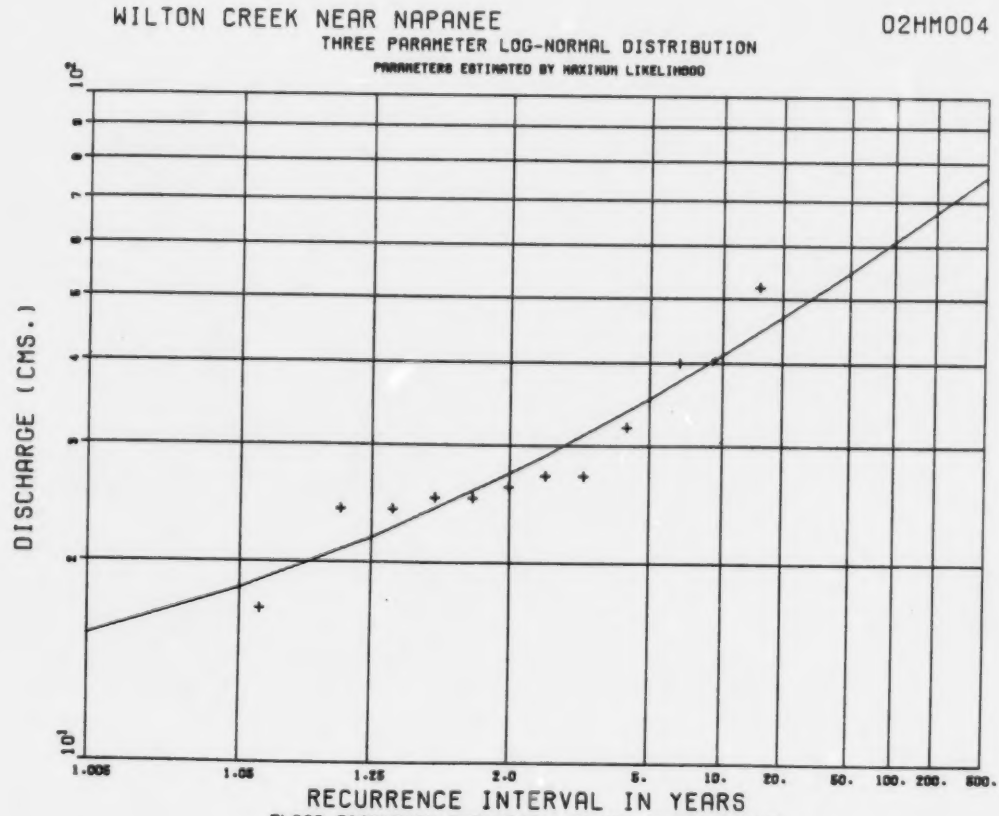
DRAINAGE AREA = 112.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1972 - 1982

SAMPLE STATISTICS
MEAN = 29. S.D. = 9.5 C.S. = 1.6230 C.K. = 7.1470
SAMPLE STATISTICS (LOGS)
MEAN = 3.3257 S.D. = .2929 C.S. = .8107 C.K. = 5.7501
SAMPLE MIN = 17. SAMPLE MAX = 52. N = 11

PARAMETERS FOR GUMBEL I A = .161028 U = 25.
PARAMETERS FOR LOGNORMAL M = 3.3257 S = .2929
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 11. M = 2.8036 S = .4784
STATISTICS OF LOG(X-A)
MEAN = 2.8036 S.D. = .4784 C.S. = .0952 C.K. = 5.8236
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = .1187 B = .6086E+01 LOG(M) = 2.6030
ME= .1350E+02
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = .0754 B = .1349E+02
LOG(P)F= 2.3089 M = .1006E+02
DISTRIBUTION STATISTICS MEAN = 3.3257 S.D. = .2768 C.S. = .5444

	GUMBEL I		LOGNORMAL		THREE PARAMETER LOGNORMAL		MAX. LIKELIHOOD	LOG PEARSON III	MOMENTS	
RETURN PERIOD	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.	F.E.	S.E.P.
1.005	15.		13.		16.		16.		16.	
1.050	18.		17.		18.		19.		19.	
1.250	22.		22.		22.		22.		22.	
2.000	27.		28.		27.		27.		27.	
2.330	29.	8.26	29.	8.90	29.	9.59	29.	9.01	28.	10.40
5.000	35.	9.78	36.	10.30	35.	11.70	35.	11.10	35.	12.50
10.000	39.	11.10	41.	11.90	41.	14.60	40.	14.20	41.	16.50
20.000	44.	12.10	45.	13.50	47.	18.60	46.	18.10	48.	22.50
50.000	49.	13.30	51.	15.60	55.	24.00	53.	24.00	57.	32.20
100.000	54.	14.10	55.	17.00	61.	28.10	59.	28.90	65.	40.50
200.000	58.	14.70	59.	18.40	67.	32.30	65.	34.00	74.	49.50
500.000	64.	15.50	65.	20.00	76.	37.90	74.	41.10	87.	62.00

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I397.0

WINDIGO RIVER ABOVE MUSKRAT DAM LAKE 04CB001

DRAINAGE AREA : 10800.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1980

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	217.	65.	.114	4.765
LN X SERIES	5.34	.33	-.704	5.529

X(MIN)= 101. CMS.
X(MAX)= 340. CMS.
TOTAL SAMPLE SIZE= 13
NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

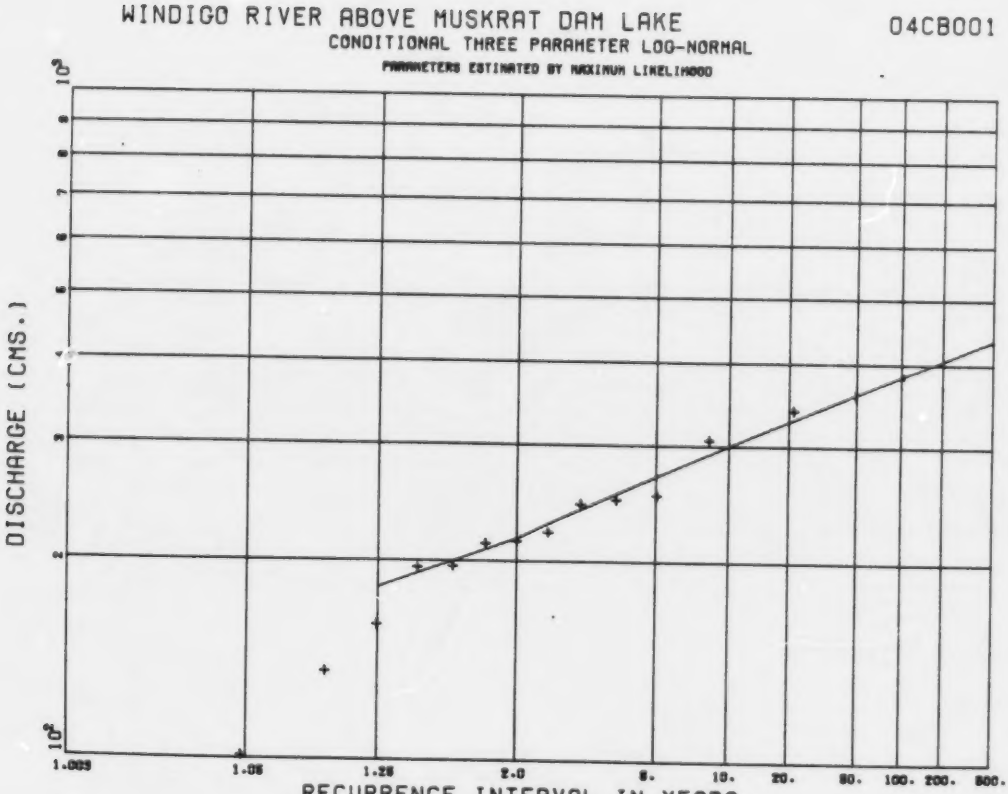
SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	227.	57.	.401	5.151
LN X SERIES	5.40	.24	-.198	5.043
LN (X-A) SERIES	5.67	.19	-.023	4.958

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -66.7947 M = 5.6659 S = .1929

FLOOD FREQUENCY REGIME

CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	142.
2.000	.500	216.
2.330	.429	227.
5.000	.200	259.
10.000	.100	300.
20.000	.050	327.
50.000	.020	360.
100.000	.010	383.
200.000	.005	405.
500.000	.002	434.



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : 1398.0

WINISK RIVER AT KANUCHUAN RAPIDS 04DA002

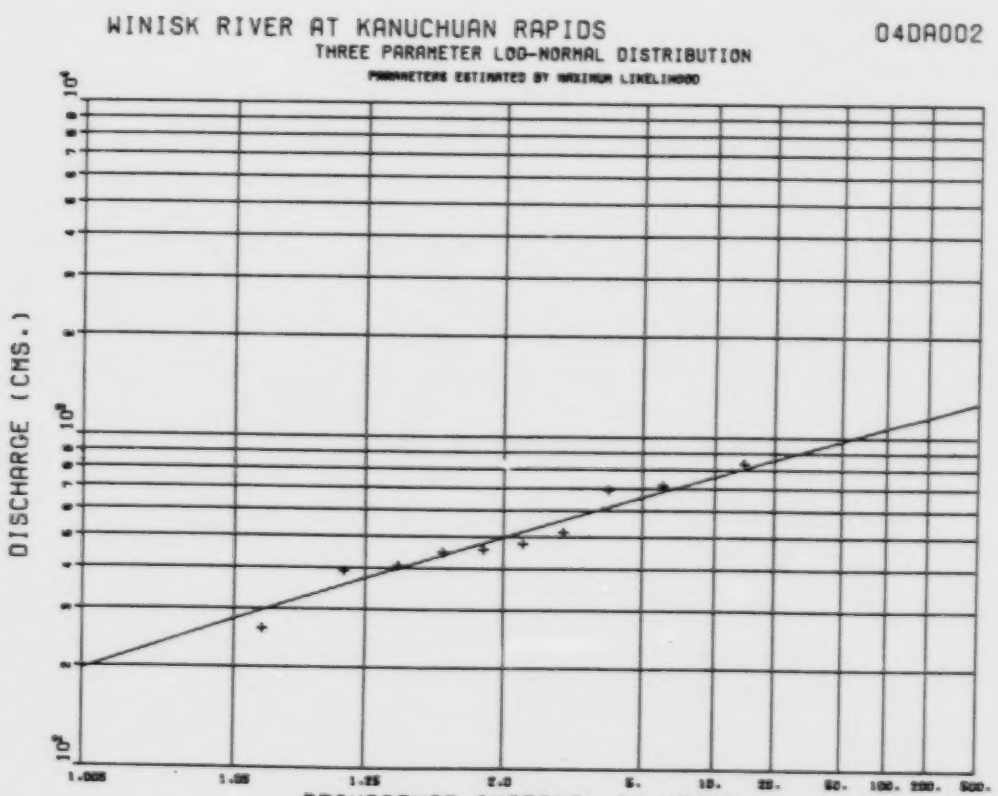
DRAINAGE AREA : 19888.8 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD : 1968 - 1977

SAMPLE STATISTICS
MEAN = 520. S.D. = 175.1 C.S. = .5835 C.K. = 4.0849
SAMPLE STATISTICS (LOGS)
MEAN = 6.2018 S.D. = .3413 C.S. = -.1542 C.K. = 4.4767
SAMPLE MIN = 261. SAMPLE MAX = 835. N = 10

PARAMETERS FOR GUMBEL I A = .007252 U = 441.
PARAMETERS FOR LOGNORMAL M = 6.2018 S = .3413
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -57. M = 6.3164 S = .3042
STATISTICS OF LOG(X-A)
MEAN = 6.3164 S.D. = .3042 C.S. = -.8574 C.K. = 4.3397
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.8263 B = .1683E+03 LOG(M) =18.6301
ME= .4136E+05
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.8379 B = .7342E+02
LOG(M)F= 8.9824 M = .7961E+04
DISTRIBUTION STATISTICS MEAN = 6.2018 S.D. = .3245 C.S. = -.2334

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	211.		205.		196.		199.		195.	
1.050	288.		282.		278.		284.		277.	
1.250	376.		370.		371.		377.		371.	
2.000	492.		494.		496.		500.		498.	
2.330	521.	10.60	525.	10.90	527.	11.40	529.	10.90	529.	11.60
5.000	648.	12.15	658.	12.60	658.	12.20	661.	11.20	659.	12.10
10.000	752.	13.40	765.	14.60	760.	14.50	762.	12.60	760.	13.80
20.000	851.	14.50	865.	16.60	856.	17.20	853.	15.00	852.	16.70
50.000	979.	15.70	995.	19.00	977.	21.60	973.	19.20	967.	21.70
100.000	1080.	16.40	1098.	20.80	1070.	25.60	993.	22.90	1054.	25.90
200.000	1170.	17.00	1198.	22.40	1158.	28.40	1060.	26.90	1130.	30.50
500.000	1300.	17.70	1320.	24.50	1270.	32.50	1150.	32.20	1240.	36.80

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I399.0

WINISK RIVER BELOW ASHEWEIG RIVER TRIBUTARY 04DC001

DRAINAGE AREA 50000.0 SQ. KM.
---NATURAL FLOW---
PERIOD OF RECORD: 1966 - 1981

FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1571.	442.	-.088	4.133
LN X SERIES	7.29	.32	-.807	5.223

X(MIN)= 689. CMS. TOTAL SAMPLE SIZE= 16
X(MAX)= 2392. CMS. NO. OF OUTLIERS= 1

AFTER REMOVAL OF OUTLIER(S)

SAMPLE PARAMETERS	MEAN	SD	CS	CK
X SERIES	1586.	364.	.441	4.152
LN X SERIES	7.34	.25	-.202	4.319
LN (X-A) SERIES	7.64	.19	-.824	4.207

CONDITIONAL PROBABILITY FUNCTION (MAXIMUM LIKELIHOOD)
PARAMETERS A = -536.3265 M = 7.6444 S = .1851

FLOOD FREQUENCY REGIME

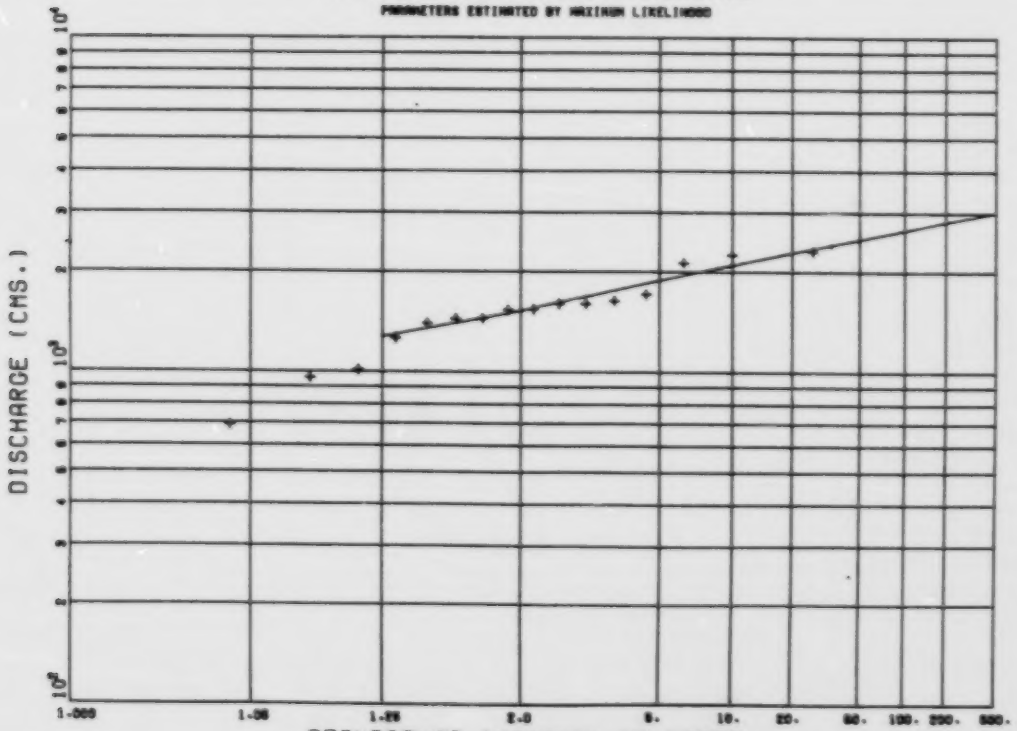
CONDITIONAL THREE PARAMETER LOGNORMAL
(MAXIMUM LIKLIHOOD)

RETURN PERIOD	EXCEEDANCE PROBABILITY	FLOOD CMS.
1.003	.997	-
1.050	.952	-
1.250	.800	1270.
2.000	.500	1520.
2.330	.429	1590.
5.000	.200	1880.
10.000	.100	2090.
20.000	.050	2240.
50.000	.020	2500.
100.000	.010	2660.
200.000	.005	2820.
500.000	.002	3010.

WINISK RIVER BELOW ASHEWEIG RIVER TRIBUTARY 04DC001

CONDITIONAL THREE PARAMETER LOG-NORMAL

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I-400 0

YORK RIVER NEAR BANCROFT (1948 - 1982) 02KD002

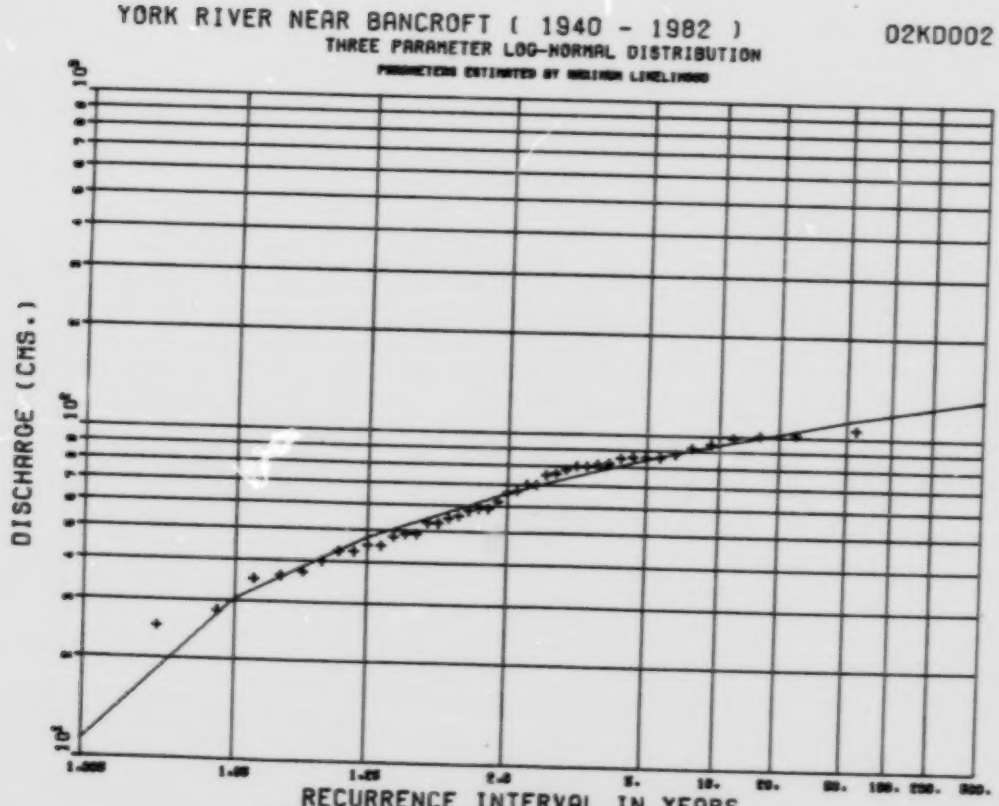
DRAINAGE AREA : 837.0 SQ. KM.
REGULATED FLOW : CLASS
PERIOD OF RECORD : 1948 - 1982

SAMPLE STATISTICS
MEAN = 66. S.D. = 21.9 C.S. = .0312 C.K. = 2.1974
SAMPLE STATISTICS (LOGS)
MEAN = 4.1259 S.D. = .3649 C.S. = -.5639 C.K. = 2.8448
SAMPLE MIN = 25. SAMPLE MAX = 106. N = 43

PARAMETERS FOR GUMBEL I A = .050744 U = 55.
PARAMETERS FOR LOGNORMAL M = 4.1259 S = .3649
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = -709. M = 6.6521 S = .0282
STATISTICS OF LOG(X-A)
MEAN = 6.6521 S.D. = .0282 C.S. = -.0101 C.K. = 2.2882
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.1029 B = .1258E+02 LOG(M) = 5.4203
ME= .2259E+03
PARAMETERS FOR LOG PEARSON III BY MAXIMUM LIKELIHOOD A = -.2681 B = .2190E+01
LOG(M)F= 4.7130 M = .1114E+03
DISTRIBUTION STATISTICS MEAN = 4.1259 S.D. = .3967 C.S. =-1.3516

RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	22.		24.		11.		14.		26.	
1.050	33.		34.		30.		29.		35.	
1.250	46.		46.		47.		47.		46.	
2.000	62.		62.		66.		67.		64.	
5.330	87.	5.74	86.	5.61	89.	5.22	72.	0.00	88.	5.99
10.000	99.	6.99	99.	7.51	94.	5.06	94.	0.00	96.	5.84
20.000	114.	7.48	113.	8.54	102.	5.75	99.	0.00	106.	7.08
50.000	132.	8.01	131.	9.81	112.	6.94	104.	0.00	117.	9.55
100.000	146.	8.34	145.	10.70	118.	7.98	106.	0.00	124.	11.70
200.000	159.	8.61	159.	11.60	124.	8.89	108.	0.00	131.	14.00
500.000	176.	8.92	177.	12.60	131.	10.20	110.	0.00	139.	17.20

F.E.= FLOOD ESTIMATE (CMS)
S.E.P.= STANDARD ERROR PERCENT



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I401.0
I-430

YOUNG CREEK NEAR VITTORIA 02GC014

DRAINAGE AREA : 65.8 SQ. KM.
REGULATED FLOW : CLASS 2
PERIOD OF RECORD : 1967 - 1978

SAMPLE STATISTICS
MEAN = 7. S.D. = 3.6 C.S. = .4350 C.K. = 2.6539
SAMPLE STATISTICS (LOGS)
MEAN = 1.7651 S.D. = .5778 C.S. = -.1966 C.K. = 3.1037
SAMPLE MIN = 2. SAMPLE MAX = 13. N = 12

PARAMETERS FOR GUMBEL I A = .362349 U = 5.
PARAMETERS FOR LOGNORMAL M = 1.7651 S = .5778
PARAMETERS FOR THREE PARAMETER LOGNORMAL A = 0. M = 1.7587 S = .5861
STATISTICS OF LOG(X-A)
MEAN = 1.7587 S.D. = .5861 C.S. = -.2118 C.K. = 3.1353
PARAMETERS FOR LOG PEARSON III BY MOMENTS A = -.0568 B = .1035E+03 LOG(M) = 7.6429
ME= .2086E+04

NO MAXIMUM LIKELIHOOD SOLUTION FOR LOG PEARSON III

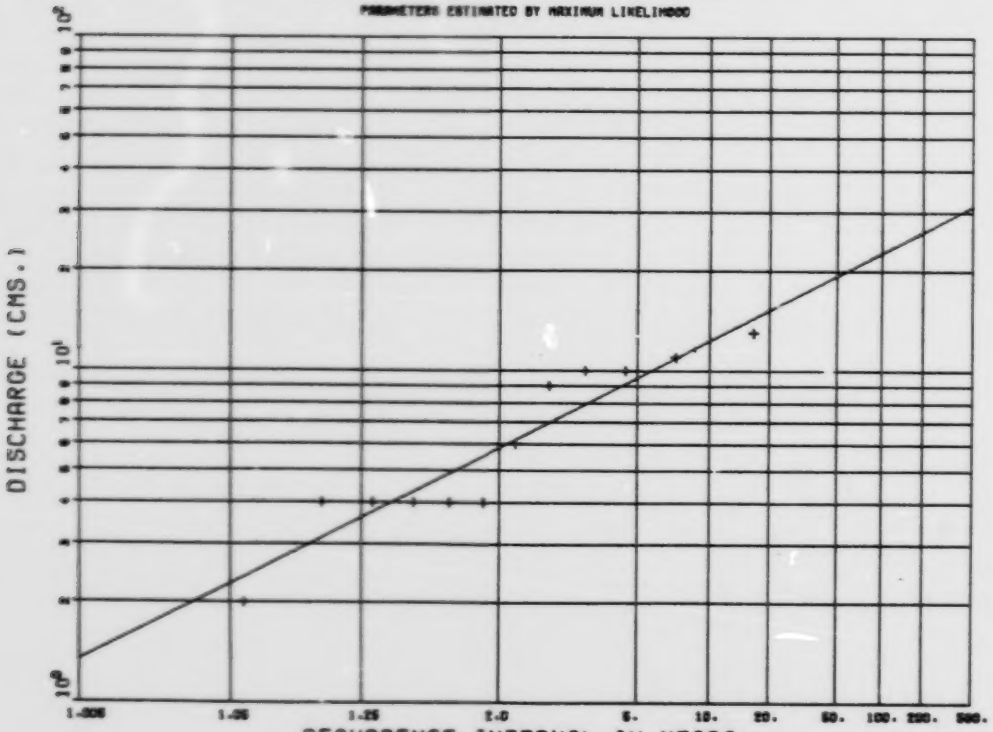
RETURN PERIOD	GUMBEL I F.E.	GUMBEL I S.E.P.	LOGNORMAL F.E.	LOGNORMAL S.E.P.	THREE PARAMETER LOGNORMAL F.E.	THREE PARAMETER LOGNORMAL S.E.P.	LOG PEARSON III MAX. LIKELIHOOD F.E.	LOG PEARSON III MAX. LIKELIHOOD S.E.P.	LOG PEARSON III MOMENTS F.E.	LOG PEARSON III MOMENTS S.E.P.
1.005	0.		1.		1.		0.		1.	
1.050	2.		2.		2.		0.		2.	
1.250	4.		4.		4.		0.		4.	
2.002	6.		6.		6.		0.		6.	
2.330	7.	15.10	6.	16.80	6.	17.60	0.	0.00	7.	17.90
5.000	9.	15.50	10.	19.40	10.	19.50	0.	0.00	10.	18.50
10.000	11.	16.30	12.	22.50	12.	23.40	0.	0.00	12.	20.90
20.000	13.	16.90	15.	25.60	15.	27.50	0.	0.00	15.	23.20
50.000	16.	17.70	19.	29.40	19.	34.20	0.	0.00	18.	32.70
100.000	18.	18.10	22.	32.10	23.	38.90	0.	0.00	21.	39.20
200.000	20.	18.50	26.	34.70	26.	43.50	0.	0.00	23.	46.10
500.000	22.	18.90	31.	37.80	31.	49.50	0.	0.00	27.	55.70

F.E.= FLOOD ESTIMATE(CMS)
S.E.P.= STANDARD ERROR PERCENT

YOUNG CREEK NEAR VITTORIA 02GC014

THREE PARAMETER LOG-NORMAL DISTRIBUTION

PARAMETERS ESTIMATED BY MAXIMUM LIKELIHOOD



FLOOD FREQUENCY ANALYSIS - ANNUAL FLOOD SERIES
FIGURE : I402.0

TABLES

Table I1.0

Flow data used for single station flood frequency analysis
[Page # I-423]

Table I1.1

Legend to Water Survey of Canada station numbers
(arranged in alphanumeric order)
[Page # I-455]

Table I1.2

Streamflow stations used and notes on data
(arranged in alphbetical order by station name)
[Page # I-458]

TABLE II.0
PAGE 1 OF 32

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02AA001
AREA: 1550.
NATURAL FLOW

YEAR	MO	FLOW
1924	5	98.
1925	4	151.
1926	4	103.
1927	4	209.
1928	4	176.
1929	4	86.
1930	11	215.
1931	11	49.
1932	11	128.
1933	4	150.
1934	5	311.
1935	4	171.
1936	5	255.
1937	4	180.
1938	4	136.
1939	5	136.
1940	5	103.
1941	4	165.
1942	4	117.
1943	4	103.
1944	6	129.
1945	3	180.
1946	3	94.
1947	6	184.
1948	4	283.
1949	4	94.
1950	5	209.
1951	5	212.
1952	4	139.
1953	5	118.
1954	5	262.
1955	4	90.
1956	5	119.
1957	4	158.
1958	11	54.
1959	5	61.
1960	4	89.
1961	4	100.
1962	4	45.
1963	6	81.
1964	5	234.
1965	4	124.
1966	5	115.
1967	4	113.
1968	7	103.
1969	4	133.

STATION:02AA001
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1970	4	164.
1971	4	143.
1972	5	137.
1973	4	91.
1974	5	132.
1975	4	101.
1976	4	183.
1977	9	264.
1978	5	102.
1979	5	212.
1980	9	100.
1981	4	107.
1981	4	162.

STATION:02AA002
AREA: 389.
NATURAL FLOW

YEAR	MO	FLOW
1973	11	92.
1974	5	63.
1975	4	68.
1976	4	127.
1977	9	198.
1978	6	92.

STATION:02AB001
AREA: 3630.
REGULATION: R3

YEAR	MO	FLOW
1922	8	46.
1923	11	43.
1924	9	59.
1925	11	40.
1926	11	43.
1927	5	163.
1928	10	61.
1929	8	38.
1930	3	44.
1931	12	28.
1932	5	56.
1933	5	58.
1934	5	112.
1935	5	62.
1936	5	72.
1937	6	159.
1938	5	257.
1939	7	69.
1940	8	41.
1941	10	90.
1942	5	58.
1943	6	193.
1944	8	245.
1945	4	106.
1946	10	113.
1947	6	257.
1948	9	69.
1949	2	43.
1950	5	335.
1951	5	189.
1952	7	121.
1953	6	122.
1954	5	137.
1955	7	45.
1956	9	46.

STATION:02AB004
AREA: 3760.
REGULATION: R3

YEAR	MO	FLOW
1924	1	30.
1925	11	37.
1926	2	63.
1927	5	122.
1928	10	61.
1929	8	34.
1930	2	46.
1931	12	25.
1932	5	59.
1933	5	59.
1934	5	106.
1935	5	64.
1936	5	58.
1937	6	133.
1938	5	241.
1939	7	63.
1940	8	45.
1941	10	99.
1942	3	55.
1943	6	225.
1944	8	264.
1945	4	149.
1946	10	105.
1947	6	286.
1948	9	62.
1949	9	48.
1950	5	259.
1951	5	154.
1952	7	107.
1953	6	118.
1954	5	142.
1955	8	37.
1956	12	39.
1957	6	86.
1958	8	49.
1959	1	57.
1960	2	59.
1961	9	106.
1962	6	82.
1963	6	201.
1964	6	180.
1965	12	55.
1966	5	86.
1967	7	57.
1968	6	269.
1969	5	53.

STATION:02AB004
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1970	5	138.
1971	6	119.
1972	7	55.
1973	7	56.
1974	2	53.
1975	4	55.
1976	10	55.
1977	9	191.
1978	3	55.
1979	7	55.
1980	1	46.
1981	6	76.
1982	8	91.

STATION:02AB005
AREA: 2560.
REGULATION: R3

YEAR	MO	FLOW
1933	5	106.
1934	5	155.
1935	4	197.
1936	5	160.
1937	5	146.
1938	5	195.
1939	4	141.
1940	6	44.
1941	6	136.
1942	5	91.
1943	6	222.
1944	5	180.
1945	4	152.
1946	4	78.
1947	6	348.
1948	4	114.
1949	5	67.
1950	5	364.
1951	5	379.
1952	4	170.
1953	6	197.
1954	5	236.
1955	4	55.
1956	6	135.
1957	4	207.

STATION:02AB006
AREA: 6480.
REGULATION: R3

YEAR	MO	FLOW
1926	7	104.
1927	5	357.
1928	10	95.
1929	4	136.
1930	5	85.
1931	5	147.
1932	5	138.
1933	5	159.
1934	5	359.
1935	4	264.
1936	5	346.
1937	6	267.
1938	5	447.
1939	4	223.
1940	6	71.
1941	6	314.
1942	5	156.
1943	6	420.
1944	8	431.
1945	4	329.
1946	10	200.
1947	6	644.
1948	4	174.
1949	5	124.
1950	5	526.
1951	5	441.
1952	4	248.
1953	6	282.
1954	5	463.
1955	4	142.
1956	6	184.
1957	4	298.
1958	12	114.
1959	9	169.
1960	4	156.
1961	9	207.
1962	8	190.
1963	6	477.
1964	6	481.
1965	10	281.
1966	5	245.
1967	5	195.
1968	6	478.
1969	4	284.
1970	5	274.
1971	5	317.

STATION:02AB006
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1972	5	227.
1973	11	126.
1974	5.	163.
1975	4	130.
1976	4	262.
1977	9	292.
1978	5	180.
1979	5	239.
1980	9	142.
1981	4	160.
1982	7	319.

STATION:02AB008
AREA: 187.
NATURAL FLOW

YEAR	MO	FLOW
1954	5	52.
1955	4	20.
1956	4	23.
1957	4	37.
1958	11	8.
1959	5	9.
1960	4	26.
1961	4	13.
1962	4	14.
1963	6	29.
1964	5	36.
1965	10	26.
1966	4	27.
1967	4	17.
1968	7	74.
1969	4	38.
1970	4	26.
1971	5	75.
1972	4	32.
1973	8	41.
1974	4	31.
1975	4	20.
1976	4	56.
1977	9	74.
1978	4	17.
1979	5	44.
1980	9	18.
1981	4	25.
1982	7	30.

STATION:02AB009
AREA: 2800.
REGULATION: R3

YEAR	MO	FLOW
1971	5	222.
1972	5	201.
1973	4	104.
1974	4	131.
1975	4	91.
1976	4	297.
1977	9	240.
1978	6	158.
1979	5	204.
1980	9	105.
1981	4	101.
1982	7	275.

STATION:02AB010
AREA: 6710.
REGULATION: R3

YEAR	MO	FLOW
1924	9	110.
1925	4	122.
1926	7	162.
1927	5	284.
1928	5	103.
1929	4	135.
1930	11	94.
1931	5	177.
1932	4	182.
1933	5	189.
1934	5	369.
1935	4	309.
1936	5	348.
1937	6	196.
1938	5	421.
1939	4	580.
1940	5	360.
1941	6	317.
1942	5	131.
1943	6	439.
1944	5	330.
1945	4	348.
1946	10	178.
1947	6	520.
1948	4	192.
1949	4	133.
1950	5	429.
1951	5	416.
1952	4	234.
1953	6	287.
1954	5	337.

STATION:02AB010
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1955	4	124.
1956	6	147.
1957	4	314.
1958	11	68.
1959	9	177.
1960	4	182.
1961	9	199.
1962	8	141.
1963	6	391.
1964	6	404.
1965	10	302.
1966	4	274.
1967	5	173.
1968	6	472.
1969	4	320.
1970	5	299.
1971	5	349.
1972	5	267.
1973	11	158.
1974	4	173.
1975	4	126.
1976	4	361.
1977	9	406.
1978	5	183.
1979	5	254.
1980	9	167.
1981	4	173.
1982	7	337.

STATION:02AB012
AREA: 174.
REGULATION: R3

YEAR	MO	FLOW
1952	8	3.01
1953	11	6.27
1954	10	2.57
1955	1	1.72
1956	2	5.50
1957	11	3.81
1958	2	2.29
1959	12	1.79
1960	12	2.64
1961	2	3.09
1962	11	2.36
1963	11	1.45
1964	7	8.27
1965	8	4.65
1966	4	4.16
1967	6	3.05
1968	3	7.23
1969	5	5.57
1970	6	4.29
1971	8	6.13
1972	1	2.90
1973	3	4.83
1974	7	13.55
1975	5	3.21
1976	7	3.54
1977	9	5.60

STATION:02AB013
AREA: 526.
REGULATION: R3

YEAR	MO	FLOW
1952	7	7.59
1953	6	14.20
1954	5	10.05
1955	4	4.75
1956	6	11.25
1957	6	8.89
1958	6	4.67
1959	6	6.23
1960	1	3.94
1961	7	9.20
1962	8	6.57
1963	6	13.
1964	6	15.50
1965	5	15.05
1966	5	12.35
1967	8	10.66
1968	6	16.90
1969	5	8.50
1970	5	20.10
1971	11	16.10
1972	6	9.44
1973	11	6.05
1974	5	13.35
1975	6	7.60
1976	4	8.51
1977	9	15.80
1978	6	12.80
1979	5	17.20
1980	9	12.60
1981	5	10.70
1982	7	10.60

STATION:02AB014
AREA: 112.
NATURAL FLOW

YEAR	MO	FLOW
1972	5	26.
1973	11	23.
1974	7	27.
1975	4	11.
1976	4	28.
1977	9	45.
1978	4	15.
1979	5	25.
1980	9	15.
1981	4	12.
1982	4	25.
1983	4	14.

STATION:02AB015
AREA: 492.
REGULATION: R3

YEAR	MO	FLOW
1972	5	79.
1973	4	51.
1974	4	45.
1975	5	40.
1976	4	120.
1977	9	54.
1978	5	34.
1979	5	60.
1980	4	43.
1981	4	41.
1982	4	59.
1983	4	50.

STATION:02AB016
AREA: 145.
REGULATION: R1

YEAR	MO	FLOW
1972	5	20.
1973	11	29.
1974	5	45.
1975	4	13.
1976	4	72.
1977	9	44.
1978	4	14.
1979	5	26.
1980	4	12.
1981	6	11.
1982	11	24.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02AC001
AREA: 736.
NATURAL FLOW

YEAR	MO	FLOW
1971	5	179.
1972	5	95.
1973	4	58.
1974	4	72.
1975	5	60.
1976	4	125.
1977	9	56.
1978	4	45.
1979	5	94.
1980	4	52.
1981	4	30.
1982	4	50.

STATION:02AC002
AREA: 2980.
REGULATION: R3

YEAR	MO	FLOW
1971	5	237.
1972	5	93.
1973	5	65.
1974	5	131.
1975	6	91.
1976	4	143.
1977	9	106.
1978	6	82.
1979	5	128.
1980	5	82.
1981	6	64.
1982	5	94.

STATION:02AD006
AREA: 24500.
REGULATION: R3

YEAR	MO	FLOW
1927	7	502.
1928	5	417.
1929	11	317.
1930	9	287.
1931	6	284.
1932	6	384.
1933	6	346.
1934	7	507.
1935	5	488.
1936	6	447.
1937	1	352.
1938	5	452.
1939	6	379.
1940	8	315.
1941	11	287.
1942	5	454.
1943	4	285.

STATION:02AD008
AREA: 24600.
REGULATION: R3

YEAR	MO	FLOW
1951	4	561.
1952	4	534.
1953	7	520.
1954	6	623.
1955	3	548.
1956	6	538.
1957	7	568.
1958	12	537.
1959	3	553.
1960	2	440.
1961	4	445.
1962	1	444.
1963	6	521.
1964	12	653.
1965	1	579.
1966	7	631.
1967	2	434.
1968	7	640.
1969	7	612.
1970	11	613.
1971	6	596.
1972	3	562.
1973	1	452.
1974	6	592.
1975	5	508.
1976	10	473.
1977	12	450.
1978	12	461.
1979	4	474.

STATION:02AD010
AREA: 650.
NATURAL FLOW

YEAR	MO	FLOW
1972	5	57.
1973	4	52.
1974	5	52.
1975	6	56.
1976	4	60.
1977	4	73.
1978	6	39.
1979	5	48.
1980	5	52.
1981	4	24.

STATION:02AE001
AREA: 616.
NATURAL FLOW

YEAR	MO	FLOW
1975	6	63.
1976	5	149.
1977	9	97.
1978	5	29.
1979	5	93.
1980	5	62.
1981	5	21.
1982	5	82.

STATION:02BA002
AREA: 1190.
NATURAL FLOW

YEAR	MO	FLOW
1970	5	77.
1971	5	92.
1972	5	71.
1973	4	60.
1974	5	59.
1975	5	80.
1976	4	99.
1977	4	80.
1978	6	40.
1979	5	97.
1980	5	83.
1981	6	31.
1982	5	109.

STATION:02BA003
AREA: 1320.
NATURAL FLOW

YEAR	MO	FLOW
1973	4	117.
1974	6	99.
1975	5	128.
1976	4	236.
1977	4	178.
1978	5	86.
1979	5	272.
1980	5	137.
1981	6	55.
1982	5	198.

STATION:02BB002
AREA: 1980.
NATURAL FLOW

YEAR	MO	FLOW
1968	4	237.
1969	4	182.
1970	5	185.
1971	5	207.
1972	5	199.
1973	5	189.
1974	5	162.
1975	5	199.
1976	4	248.
1977	4	237.
1978	5	122.
1979	5	302.
1980	5	232.
1981	4	91.
1982	5	237.

STATION:02BB003
AREA: 4270.
NATURAL FLOW

YEAR	MO	FLOW
1970	5	450.
1971	5	484.
1972	4	433.
1973	4	388.
1974	5	317.
1975	5	419.
1976	4	759.
1977	4	526.
1978	5	239.
1979	5	609.
1980	5	458.
1981	5	156.
1982	5	461.

STATION:02BC002
AREA: 2400.
REGULATION: R

YEAR	MO	FLOW
1953	5	148.
1954	5	195.
1955	4	126.
1956	5	160.
1957	4	217.
1958	4	140.
1959	5	200.
1960	5	154.

STATION:02BC004
AREA: 4170.
REGULATION: R3

YEAR	MO	FLOW
1960	5	297.
1961	5	242.
1962	5	173.
1963	6	245.
1964	5	306.
1965	5	188.
1966	5	334.
1967	5	234.
1968	7	283.
1969	5	202.
1970	5	165.
1971	5	220.
1972	5	228.
1973	5	251.
1974	5	212.
1975	5	193.
1976	4	317.
1977	4	208.
1978	7	60.
1979	5	428.
1980	5	244.
1981	5	199.
1982	5	240.

STATION:02BD001
AREA: 1640.
REGULATION: R3

YEAR	MO	FLOW
1921	4	73.
1922	5	144.
1923	10	60.
1924	5	45.
1925	4	100.
1926	7	89.
1927	4	143.
1928	5	151.
1929	5	59.
1930	5	114.
1931	5	83.
1932	5	67.
1933	5	109.
1934	5	177.
1935	5	105.
1936	5	167.
1937	5	139.
1938	5	126.
1939	5	185.

STATION:02BD002
AREA: 5130.
REGULATION: R3

YEAR	MO	FLOW
1934	5	461.
1935	5	264.
1936	5	458.
1937	5	291.
1938	5	498.
1939	5	728.
1940	5	230.
1941	5	294.
1942	4	236.
1943	5	284.
1944	5	352.
1945	4	227.

STATION:02BD002
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1946	5	230.
1947	6	673.
1948	4	360.
1949	5	529.
1950	5	424.
1951	5	292.
1952	4	213.
1953	5	325.
1954	5	283.
1955	4	208.
1956	5	270.
1957	4	601.
1958	4	114.
1959	10	380.
1960	5	504.
1961	6	193.
1962	6	215.
1963	6	130.
1964	11	117.
1965	10	259.
1966	5	306.
1967	5	253.
1968	8	235.
1969	1	150.
1970	6	161.
1971	6	230.
1972	1	221.
1973	5	354.
1974	6	180.
1975	5	175.
1976	5	185.
1977	4	157.
1978	4	100.
1979	5	445.
1980	4	126.
1981	5	181.
1982	5	136.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02BB003
AREA: 1930.
REGULATION: R3

YEAR	MO	FLOW
1966	5	134.
1967	4	153.
1968	7	261.
1969	5	118.
1970	5	189.
1971	5	175.
1972	5	136.
1973	5	177.
1974	5	175.
1975	5	238.
1976	4	309.
1977	4	180.
1978	5	121.
1979	5	381.
1980	5	140.
1981	5	162.
1982	5	137.

STATION:02BE001
AREA: 2850.
NATURAL FLOW

YEAR	MO	FLOW
1930	6	207.
1931	11	200.
1932	5	187.
1933	5	243.
1934	5	351.
1935	4	219.

STATION:02BE002
AREA: 2880.
REGULATION: R3

YEAR	MO	FLOW
1952	4	215.
1953	5	414.
1954	5	326.
1955	4	182.
1956	7	140.
1957	7	122.
1958	12	60.
1959	5	324.
1960	5	431.
1961	5	221.
1962	5	174.
1963	2	77.
1964	10	94.
1965	9	118.
1966	6	146.
1967	5	205.
1968	6	155.
1969	4	83.
1970	7	93.
1971	5	277.
1972	5	195.
1973	5	160.
1974	6	94.
1975	6	93.
1976	5	153.
1977	11	85.
1978	6	82.
1979	5	431.
1980	10	70.
1981	5	77.
1982	7	79.

STATION:02BF001
AREA: 1190.
NATURAL FLOW

YEAR	MO	FLOW
1968	4	239.
1969	4	136.
1970	6	130.
1971	4	151.
1972	5	233.
1973	4	154.
1974	4	250.
1975	5	272.
1976	4	264.
1977	4	283.
1978	5	175.
1979	4	460.
1980	4	136.
1981	4	223.
1982	5	248.
1983	5	155.

STATION:02BF002
AREA: 1160.
NATURAL FLOW

YEAR	MO	FLOW
1968	4	293.
1969	6	337.
1970	6	187.
1971	4	132.
1972	5	180.
1973	4	173.
1974	4	169.
1975	5	235.
1976	4	268.
1977	4	255.
1978	5	114.
1979	4	370.
1980	4	120.
1981	4	222.
1982	5	194.

STATION:02BF003
AREA: 18.60
NATURAL FLOW

YEAR	MO	FLOW
1971	4	4.42
1972	5	6.99
1973	11	5.66
1974	4	4.85
1975	5	10.50
1976	3	5.36
1977	4	6.

STATION:02CA002
AREA: 108.
NATURAL FLOW

YEAR	MO	FLOW
1971	12	24.
1972	5	28.
1973	11	20.
1974	4	20.
1975	5	42.
1976	4	22.
1977	4	29.
1978	10	34.
1979	4	56.
1980	4	34.
1981	4	41.
1982	4	32.
1983	5	155.

STATION:02CB001
AREA: 4840.
REGULATION: R3

YEAR	MO	FLOW
1964	5	87.
1965	9	119.
1966	6	166.
1967	3	119.
1968	1	98.
1969	12	328.
1970	7	309.
1971	1	306.
1972	9	267.
1973	1	232.
1974	3	247.
1975	6	183.
1976	5	198.
1977	11	193.
1978	10	252.
1979	5	413.
1980	8	235.
1981	3	213.
1982	1	167.

STATION:02CB002
AREA: 2150.
REGULATION: R3

YEAR	MO	FLOW
1951	2	110.
1952	8	114.
1953	5	132.
1954	10	121.
1955	1	113.
1956	3	147.
1957	7	124.
1958	2	126.
1959	12	81.
1960	5	214.
1961	1	97.
1962	3	127.
1963	5	91.
1964	12	70.
1965	2	127.
1966	11	144.
1967	3	119.

STATION:02CC004
AREA: 9270.
REGULATION: R2

YEAR	MO	FLOW
1921	4	521.
1922	4	814.
1923	5	717.
1924	5	314.
1925	4	267.
1926	11	308.
1927	4	629.
1928	5	1060.
1929	4	441.
1930	7	505.
1931	11	389.
1932	5	289.
1933	4	574.
1934	5	777.
1935	5	364.
1936	5	697.
1937	5	525.
1938	4	952.
1939	5	525.
1940	6	344.
1941	4	457.
1942	4	411.
1943	6	667.
1944	5	401.
1945	3	482.
1946	5	319.
1947	6	481.
1948	4	383.
1949	5	387.
1950	5	596.

STATION:02CC005
AREA: 1960.
REGULATION: R3

YEAR	MO	FLOW
1942	11	50.
1943	6	164.
1944	4	155.
1945	3	141.
1946	3	84.
1947	5	174.
1948	4	108.
1949	4	117.
1950	5	192.
1951	4	329.
1952	4	217.
1953	4	170.
1954	4	217.
1955	4	186.
1956	5	91.
1957	4	236.
1958	5	67.
1959	4	159.
1960	5	314.
1961	9	123.
1962	5	313.
1963	4	124.
1964	4	194.
1965	5	207.
1966	4	273.
1967	5	439.
1968	4	129.
1969	4	141.
1970	6	422.
1971	4	173.
1972	5	311.
1973	5	108.
1974	4	174.
1975	5	232.
1976	4	219.
1977	4	114.
1978	10	124.
1979	4	497.
1980	4	170.
1981	4	217.
1982	4	182.

STATION:02CC007
AREA: 6840.
REGULATION: R3

YEAR	MO	FLOW
1951	4	499.
1952	4	477.
1953	5	388.
1954	4	403.
1955	4	345.
1956	4	283.
1957	4	513.
1958	6	90.
1959	10	287.
1960	5	669.
1961	5	255.
1962	5	360.
1963	4	136.
1964	4	345.
1965	5	376.
1966	4	358.
1967	5	500.
1968	4	315.
1969	4	204.
1970	6	471.
1971	4	433.
1972	5	438.
1973	5	294.
1974	5	345.
1975	5	501.
1976	4	463.
1977	11	285.
1978	10	315.
1979	5	701.
1980	4	241.
1981	4	311.
1982	5	331.
1983	6	628.

STATION:02CC008
AREA: 9300.
REGULATION: R3

YEAR	MO	FLOW
1962	5	530.
1963	4	251.
1964	4	524.
1965	5	569.
1966	4	547.
1967	5	714.
1968	4	447.
1969	6	428.
1970	6	886.
1971	4	595.
1972	5	742.
1973	5	479.
1974	5	498.
1975	5	617.
1976	4	629.
1977	4	413.
1978	5	496.
1979	4	962.
1980	4	329.
1981	4	488.
1982	5	453.

STATION:02CC009
AREA: 9810.
REGULATION: R3

YEAR	MO	FLOW
1963	12	50.
1964	5	488.
1965	5	535.
1966	4	511.
1967	5	713.
1968	4	420.
1969	6	341.
1970	6	900.
1971	4	592.
1972	5	705.
1973	5	468.
1974	5	445.
1975	5	535.
1976	4	598.
1977	4	374.
1978	10	421.
1979	4	1000.
1980	4	343.
1981	4	515.
1982	5	451.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02CD001
AREA: 1350.
NATURAL FLOW

YEAR	MO	FLOW
1967	5	152.
1968	4	65.
1969	4	83.
1970	6	133.
1971	4	98.
1972	5	144.
1973	4	59.
1974	4	102.
1975	5	106.
1976	4	100.
1977	11	90.
1978	5	86.
1979	4	126.
1980	4	81.
1981	4	119.
1982	4	99.

STATION:02CD002
AREA: 109.
REGULATION: R

YEAR	MO	FLOW
1978	10	10.
1979	4	14.
1980	4	10.
1981	4	8.
1982	5	8.

STATION:02CD003
AREA: 319.
REGULATION: R

YEAR	MO	FLOW
1978	5	18.
1979	5	30.
1980	4	18.
1981	4	22.
1982	5	23.

STATION:02CD004
AREA: 567.
REGULATION: R

YEAR	MO	FLOW
1978	5	27.
1979	5	55.
1980	5	28.
1981	4	34.
1982	5	36.

STATION:02CD005
AREA: 99.50
REGULATION: R

YEAR	MO	FLOW
1978	5	10.
1979	4	19.
1980	4	9.
1981	4	14.
1982	4	12.
1983	4	14.

STATION:02CD006
AREA: 157.
NATURAL FLOW

YEAR	MO	FLOW
1978	10	13.
1979	4	17.
1980	4	12.
1981	4	15.
1982	4	12.

STATION:02CE001
AREA: 11400.
REGULATION: R3

YEAR	MO	FLOW
1948	4	400.
1949	4	353.
1950	5	579.
1951	4	1059.
1952	4	715.
1953	4	480.
1954	10	656.
1955	4	475.
1956	5	368.
1957	7	716.
1958	4	175.
1959	4	548.

STATION:02CE001
AREA: 11400.
REGULATION: R3

YEAR	MO	FLOW
1960	5	1336.
1961	6	271.
1962	5	713.
1963	4	355.
1964	5	486.
1965	5	590.
1966	4	737.
1967	5	1003.
1968	4	400.
1969	4	506.
1970	6	1061.
1971	4	673.
1972	5	1002.
1973	5	485.
1974	5	520.
1975	4	682.
1976	4	755.
1977	4	545.
1978	5	593.
1979	4	1118.
1980	4	432.
1981	4	759.
1982	5	506.

STATION:02CE002
AREA: 1350.
REGULATION: R2

YEAR	MO	FLOW
1921	3	93.
1922	4	118.
1923	4	171.
1924	4	80.
1925	4	87.
1926	11	172.
1927	3	90.
1928	4	150.
1929	4	141.
1930	6	139.
1931	11	83.
1932	4	103.
1933	4	123.
1934	11	142.
1935	4	60.
1936	5	131.
1937	10	94.
1938	4	221.
1939	4	117.
1940	6	65.
1941	4	80.
1942	4	100.
1943	4	137.
1944	4	111.
1945	5	122.
1946	3	79.
1947	4	87.
1948	4	131.
1949	6	67.
1950	4	113.
1951	4	201.
1952	4	105.
1953	4	93.
1954	4	144.
1955	4	94.
1956	5	50.
1957	4	121.
1958	4	37.
1959	4	132.
1960	5	176.
1961	5	37.
1962	5	96.
1963	4	75.
1964	4	98.
1965	5	108.
1966	4	136.
1967	5	258.
1968	4	76.
1969	4	106.
1970	6	278.
1971	4	108.
1972	5	182.
1973	5	77.
1974	4	93.
1975	4	104.
1976	4	116.
1977	4	85.
1978	5	142.
1979	4	194.
1980	4	103.
1981	4	165.
1982	4	110.

STATION:02CE004
AREA: 61000.
REGULATION: R3

YEAR	MO	FLOW
1921	4	289.
1922	4	496.
1923	5	356.
1924	5	120.
1925	6	84.
1926	11	122.
1927	4	259.
1928	5	661.
1929	5	301.
1930	6	684.
1931	11	212.
1932	4	249.
1933	4	418.
1934	5	385.
1935	5	137.
1936	5	448.
1937	4	260.
1938	4	514.
1939	5	267.
1940	6	241.
1941	4	284.
1942	4	302.
1943	6	331.
1944	5	235.
1945	5	374.
1946	3	183.
1947	6	437.
1948	4	212.
1949	4	211.
1950	5	333.
1951	4	618.
1952	4	430.
1953	5	253.
1954	10	337.
1955	4	232.
1956	5	219.
1957	6	445.
1958	4	88.
1959	5	225.
1960	5	844.
1961	9	207.
1962	5	475.
1963	4	209.
1964	5	315.
1965	5	384.
1966	4	494.
1967	5	771.
1968	4	280.
1969	4	346.
1970	6	893.
1971	4	352.
1972	5	600.
1973	5	316.
1974	5	332.
1975	5	379.
1976	4	477.
1977	5	419.
1978	5	462.
1979	4	818.
1980	5	269.
1981	4	398.
1982	5	329.

STATION:02CF004
AREA: 4190.
REGULATION: R3

YEAR	MO	FLOW
1918	4	189.
1919	4	202.
1920	4	136.
1921	4	159.
1922	4	230.
1923	5	184.
1924	4	133.
1925	4	112.
1926	5	116.
1927	3	92.
1928	5	223.
1929	4	212.
1930	7	148.
1931	4	141.
1932	4	175.
1933	4	190.
1934	5	156.
1935	4	122.
1936	5	200.
1937	4	163.
1938	4	268.
1939	5	175.
1940	5	120.
1941	4	184.
1942	4	220.
1943	5	101.
1944	5	142.
1945	4	127.
1946	3	142.
1947	6	202.
1948	4	160.
1949	4	165.
1950	5	167.
1951	4	318.
1952	4	182.
1953	4	223.

STATION:02CF004
AREA: 4190.
REGULATION: R3

YEAR	MO	FLOW
1954	10	296.
1955	4	219.
1956	4	175.
1957	7	286.
1958	4	88.
1959	4	317.
1960	5	431.
1961	4	113.
1962	5	251.
1963	4	216.
1964	4	222.
1965	4	243.
1966	4	278.
1967	4	302.
1968	4	184.
1969	4	271.
1970	6	443.
1971	4	328.
1972	5	424.
1973	3	208.
1974	4	256.
1975	4	332.
1976	4	260.
1977	4	250.
1978	5	235.
1979	4	465.
1980	4	345.
1981	4	348.
1982	5	277.

STATION:02CF005
AREA: 89.10
REGULATION: R2

YEAR	MO	FLOW
1959	10	24.
1960	4	31.
1961	9	21.
1962	3	15.
1963	3	38.
1964	4	26.
1965	4	27.
1966	3	16.
1967	4	32.
1968	3	14.
1969	4	18.
1970	9	32.
1971	12	28.
1972	4	33.
1973	3	13.
1974	8	35.
1975	4	25.
1976	3	21.
1977	3	21.
1978	8	17.
1979	4	22.
1980	4	21.
1981	9	20.
1982	10	15.

STATION:02CF007
AREA: 272.
NATURAL FLOW

YEAR	MO	FLOW
1962	4	26.
1963	4	41.
1964	4	44.
1965	4	50.
1966	3	27.
1967	4	40.
1968	4	28.
1969	4	41.
1970	6	29.
1971	4	48.
1972	4	45.
1973	3	24.
1974	4	38.
1975	4	52.
1976	4	45.
1977	4	45.
1978	4	39.
1979	4	60.
1980	4	49.
1981	4	29.
1982	4	43.

STATION:02CF008
AREA: 155.
NATURAL FLOW

YEAR	MO	FLOW
1975	4	28.
1976	4	23.
1977	3	27.
1978	4	20.
1979	4	30.
1980	4	33.
1981	4	16.
1982	4	28.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02CF009
AREA: 21.50
REGULATION: R1

YEAR	MO	FLOW
1959	4	11.02
1960	4	15.10
1961	9	16.40
1962	8	10.90
1963	3	19.90
1964	4	9.03
1965	9	12.90
1966	3	6.50
1967	4	6.97
1968	7	10.60
1969	10	7.99
1970	9	12.60
1971	12	10.80
1972	4	16.10
1973	7	9.80
1974	10	10.80
1975	11	8.47
1976	3	9.23
1977	3	10.50
1978	8	7.14
1979	4	6.92
1980	4	9.15
1981	9	11.70
1982	10	9.01

STATION:02CF010
AREA: 697.
NATURAL FLOW

YEAR	MO	FLOW
1976	4	84.
1977	4	58.
1978	5	90.
1979	4	141.
1980	5	65.
1981	4	97.
1982	4	78.

STATION:02CF011
AREA: 704.
NATURAL FLOW

YEAR	MO	FLOW
1971	4	52.
1972	5	75.
1973	5	35.
1974	4	49.
1975	4	51.
1976	4	57.
1977	4	51.
1978	5	90.
1979	4	149.
1980	5	48.
1981	4	65.
1982	4	55.

STATION:02CF012
AREA: 287.
NATURAL FLOW

YEAR	MO	FLOW
1977	3	22.
1978	4	21.
1979	4	30.
1980	4	17.
1981	2	21.
1982	4	23.
1983	4	19.

STATION:02DB003
AREA: 2820.
REGULATION: R3

YEAR	MO	FLOW
1923	4	151.
1924	4	107.
1925	6	83.
1926	11	133.
1927	5	105.
1928	5	225.
1929	4	159.
1930	7	217.
1931	5	121.
1932	11	110.
1933	6	127.
1934	11	93.
1935	7	173.
1936	5	140.
1937	9	130.
1938	4	173.
1939	6	106.
1940	7	80.
1941	7	163.
1942	4	122.
1943	6	177.
1944	6	99.
1945	6	161.
1946	3	121.
1947	6	217.
1948	3	77.
1949	6	130.
1950	3	82.
1951	4	149.
1952	1	57.

STATION:02DB004
AREA: 64.80
NATURAL FLOW

YEAR	MO	FLOW
1942	4	23.
1943	4	22.
1944	4	16.
1945	5	35.
1946	3	24.
1947	6	28.
1948	3	18.
1949	3	18.
1950	3	34.

STATION:02DB005
AREA: 3130.
REGULATION: R3

YEAR	MO	FLOW
1953	3	211.
1954	10	256.
1955	4	135.
1956	4	132.
1957	7	255.
1958	3	67.
1959	4	127.
1960	5	316.
1961	6	161.
1962	3	138.
1963	3	159.
1964	4	167.
1965	4	116.
1966	12	126.
1967	4	269.
1968	3	69.
1969	11	108.
1970	6	247.
1971	4	148.
1972	4	172.
1973	3	164.
1974	4	150.
1975	4	163.
1976	3	129.
1977	3	148.
1978	4	90.
1979	5	326.
1980	4	178.
1981	2	116.
1982	4	119.

STATION:02DB006
AREA: 2750.
REGULATION: R

YEAR	MO	FLOW
1974	5	80.
1975	8	84.
1976	4	101.
1977	4	104.
1978	3	55.
1979	4	205.
1980	5	106.

STATION:02DC003
AREA: 6660.
REGULATION: R3

YEAR	MO	FLOW
1922	4	588.
1923	4	497.
1924	5	277.
1925	4	223.
1926	5	309.
1927	4	255.
1928	5	562.
1929	5	365.
1930	7	413.
1931	4	224.
1932	11	239.
1933	4	297.
1934	5	351.
1935	5	178.
1936	5	362.
1937	5	312.
1938	4	378.
1939	5	303.
1940	5	234.
1941	4	396.
1942	4	266.
1943	5	352.
1944	4	237.
1945	6	381.
1946	3	243.
1947	6	501.
1948	4	287.
1949	6	290.
1950	5	284.
1951	4	552.
1952	4	338.
1953	3	484.
1954	10	398.
1955	4	273.
1956	5	252.
1957	7	482.
1958	1	140.
1959	5	311.
1960	5	623.
1961	4	198.
1962	5	354.
1963	4	195.
1964	4	266.
1965	9	380.

STATION:02DC003
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1966	12	321.
1967	5	438.
1968	4	196.
1969	4	282.
1970	6	542.
1971	4	315.
1972	5	521.
1973	5	280.
1974	5	298.
1975	5	368.
1976	4	342.
1977	4	400.
1978	5	282.
1979	5	958.
1980	4	357.
1981	4	447.
1982	4	310.

STATION:02DC004.
AREA: 2900.
REGULATION: R3

YEAR	MO	FLOW
1942	4	154.
1943	5	201.
1944	5	150.
1945	6	220.
1946	3	103.
1947	6	264.
1948	4	133.
1949	4	139.
1950	5	160.
1951	4	250.
1952	4	197.
1953	4	174.
1954	10	186.
1955	4	138.
1956	5	127.
1957	7	252.
1958	4	91.
1959	5	176.
1960	5	422.
1961	5	87.

STATION:02DC005
AREA: 2460.
REGULATION: R3

YEAR	MO	FLOW
1945	6	96.
1946	6	66.
1947	6	149.
1948	4	79.
1949	6	151.
1950	4	54.
1951	11	130.
1952	6	66.
1953	3	114.
1954	6	134.
1955	11	80.
1956	6	91.
1957	7	147.
1958	1	79.
1959	5	84.
1960	5	181.
1961	1	82.
1962	2	85.

STATION:02DC007
AREA: 1360.
REGULATION: R3

YEAR	MO	FLOW
1941	11	75.
1942	4	44.
1943	6	74.
1944	1	33.
1945	6	74.
1946	1	30.
1947	6	99.
1948	12	32.
1949	6	65.
1950	7	40.
1951	10	62.
1952	6	41.
1953	5	44.
1954	6	80.
1955	11	42.
1956	5	69.
1957	7	101.
1958	9	61.
1959	6	57.
1960	7	107.
1961	9	48.
1962	2	37.
1963	10	20.
1964	8	34.
1965	9	82.
1966	12	76.
1967	6	114.
1968	1	40.
1969	9	46.
1970	6	90.
1971	1	40.
1972	9	49.

STATION:02DC008
AREA: 2360.
REGULATION: R3

YEAR	MO	FLOW
1939	5	95.
1940	9	70.
1941	4	124.
1942	3	77.
1943	5	87.
1944	5	48.
1945	6	79.
1946	2	55.
1947	6	141.
1948	4	75.
1949	6	122.
1950	7	38.
1951	10	132.
1952	6	68.
1953	4	94.
1954	6	133.
1955	11	84.
1956	6	91.
1957	7	150.
1958	1	83.
1959	5	87.
1960	5	184.
1961	5	71.
1962	3	89.
1963	9	51.
1964	4	78.
1965	9	144.
1966	12	120.
1967	6	146.
1968	2	89.
1969	3	80.
1970	6	162.
1971	4	86.
1972	5	125.
1973	5	96.
1974	11	83.
1975	3	77.
1976	5	113.
1977	12	74.
1978	10	154.
1979	4	282.
1980	5	113.
1981	4	142.
1982	4	93.

STATION:02DC009
AREA: 298.
REGULATION: R3

YEAR	MO	FLOW
1949	4	44.
1950	5	22.
1951	4	31.
1952	4	50.
1953	3	43.
1954	10	31.
1955	4	33.
1956	5	30.
1957	4	36.
1958	3	19.
1959	5	23.
1960	4	32.
1961	5	21.
1962	5	45.
1963	4	36.
1964	4	23.
1965	9	37.
1966	12	25.
1967	11	34.
1968	5	22.
1969	5	25.
1970	5	39.
1971	5	25.
1972	5	25.
1973	5	22.
1974	5	28.
1975	5	27.
1976	4	16.

STATION:02DD001
AREA: 761.
REGULATION: R3

YEAR	MO	FLOW
1914	4	130.
1915	4	88.
1916	4	130.
1917	4	100.
1918	4	84.
1919	11	72.
1920	3	94.
1921	3	163.
1922	4	140.
1923	4	133.
1924	4	89.
1925	4	94.
1926	5	134.
1927	3	63.
1928	4	174.
1929	4	115.
1930	4	71.
1931	4	48.
1932	10	86.
1933	4	95.
1934	4	93.
1935	4	38.
1936	12	104.

TABLE I1.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02DD002
AREA: 420.
REGULATION: R3

YEAR	MO	FLOW
1920	3	23.
1921	3	33.
1922	4	45.
1923	4	51.
1924	5	41.
1925	4	28.
1926	5	36.
1927	12	37.
1928	4	68.
1929	4	64.
1930	4	26.
1931	4	18.
1932	4	28.
1933	4	46.
1934	5	40.
1935	4	20.
1936	12	36.
1937	4	43.
1938	4	47.
1939	4	46.
1940	5	21.
1941	4	39.
1942	4	37.
1943	4	44.
1944	4	31.
1945	3	29.
1946	3	30.
1947	4	48.
1948	4	41.
1949	4	30.
1950	3	36.
1951	4	53.
1952	1	10.

STATION:02DD004
AREA: 13900.
REGULATION: R3

YEAR	MO	FLOW
1931	11	297.
1932	11	348.
1933	4	380.
1934	11	341.
1935	5	259.
1936	5	336.
1937	4	354.
1938	4	460.
1939	4	397.
1940	11	319.
1941	4	434.
1942	4	401.
1943	6	399.
1944	5	279.
1945	6	339.
1946	3	366.
1947	6	452.
1948	4	345.
1949	4	363.
1950	11	385.
1951	4	598.
1952	4	402.
1953	4	410.
1954	10	444.
1955	4	402.
1956	11	331.
1957	12	404.
1958	1	353.
1959	12	357.
1960	5	485.
1961	11	363.
1962	5	338.

STATION:02DD005
AREA: 787.
REGULATION: R3

YEAR	MO	FLOW
1937	4	127.
1938	4	126.
1939	4	90.
1940	11	50.
1941	4	163.
1942	4	111.
1943	4	118.
1944	4	69.
1945	3	80.
1946	3	57.
1947	4	175.
1948	4	101.
1949	3	70.
1950	3	97.
1951	4	112.
1952	4	67.
1953	3	86.
1954	10	94.
1955	4	57.
1956	4	48.
1957	6	175.
1958	7	72.
1959	4	83.
1960	4	112.
1961	4	62.
1962	4	68.
1963	4	88.
1964	4	63.
1965	5	56.
1966	4	65.
1967	4	69.
1968	4	82.
1969	5	75.
1970	7	114.
1971	4	91.
1972	5	95.
1973	6	149.
1974	5	123.
1975	4	88.
1976	4	114.
1977	4	67.
1978	4	71.
1979	4	87.
1980	4	142.
1981	4	84.
1982	4	137.

STATION:02DD007
AREA: 12300.
REGULATION: R3

YEAR	MO	FLOW
1952	1	317.
1953	4	364.
1954	7	344.
1955	1	312.
1956	10	302.
1957	7	337.
1958	2	310.
1959	12	345.
1960	5	433.
1961	11	341.
1962	5	310.
1963	4	189.
1964	10	250.
1965	9	326.
1966	12	327.
1967	2	334.
1968	1	294.
1969	11	342.
1970	6	376.
1971	5	248.
1972	6	373.
1973	5	310.
1974	12	312.
1975	1	278.
1976	6	359.
1977	10	318.
1978	11	313.
1979	5	524.
1980	5	355.
1981	4	346.
1982	12	325.

STATION:02DD008
AREA: 98.40
NATURAL FLOW

YEAR	MO	FLOW
1957	6	50.
1958	4	9.
1959	4	26.
1960	4	22.
1961	4	11.
1962	4	16.
1963	4	25.
1964	4	20.
1965	5	14.
1966	4	25.
1967	4	19.
1968	4	14.
1969	4	19.
1970	7	28.
1971	4	17.
1972	8	21.
1973	4	17.
1974	4	20.
1975	5	16.
1976	5	15.
1977	4	16.
1978	4	17.
1979	4	33.
1980	4	28.
1981	4	33.
1982	4	21.

STATION:02DD009
AREA: 316.
REGULATION: R

YEAR	MO	FLOW
1956	5	18.
1957	7	40.
1958	7	27.
1959	4	28.
1960	4	37.
1961	4	18.
1962	4	21.
1963	4	24.
1964	4	23.
1965	5	25.
1966	4	24.
1967	11	22.
1968	4	24.
1969	4	24.
1970	7	26.
1971	4	27.
1972	5	59.
1973	4	26.
1974	4	32.
1975	5	28.
1976	4	36.
1977	4	22.
1978	4	24.
1979	4	28.
1980	4	40.
1981	4	30.
1982	4	35.

STATION:02DD010
AREA: 13900.
REGULATION: R3

YEAR	MO	FLOW
1962	5	334.
1963	4	326.
1964	4	283.
1965	11	372.
1966	12	420.
1967	4	433.
1968	4	340.
1969	11	413.
1970	6	419.
1971	4	371.
1972	5	413.
1973	5	374.
1974	11	365.
1975	4	345.
1976	5	388.
1977	12	351.
1978	10	357.
1979	5	526.
1980	4	464.
1981	4	400.
1982	12	408.

STATION:02DD012
AREA: 741.
REGULATION: R3

YEAR	MO	FLOW
1973	5	71.
1974	4	115.
1975	4	156.
1976	4	127.
1977	3	129.
1978	4	118.
1979	4	146.
1980	4	202.
1981	4	102.
1982	4	128.

STATION:02DD013
AREA: 70.40
NATURAL FLOW

YEAR	MO	FLOW
1974	4	14.
1975	4	18.
1976	3	19.
1977	3	14.
1978	4	11.
1979	4	9.
1980	4	17.
1981	3	11.
1982	12	12.

STATION:02DD014
AREA: 37.30
NATURAL FLOW

YEAR	MO	FLOW
1975	7	7.
1976	3	8.
1977	7	9.
1978	9	10.
1979	3	7.
1980	4	14.
1981	4	12.
1982	12	15.

STATION:02DD015
AREA: 106.
NATURAL FLOW

YEAR	MO	FLOW
1975	4	13.
1976	4	19.
1977	3	15.
1978	4	13.
1979	3	13.
1980	4	25.
1981	4	17.
1982	4	27.

STATION:02EA005
AREA: 321.
NATURAL FLOW

YEAR	MO	FLOW
1916	4	32.
1917	4	43.
1918	4	32.
1919	5	27.
1920	3	42.
1921	3	52.
1922	4	81.
1923	4	66.
1924	5	45.
1925	4	37.
1926	5	52.
1927	3	25.
1928	4	96.
1929	4	67.
1930	4	36.
1931	4	22.
1932	4	35.
1933	4	51.
1934	5	44.
1935	4	23.
1936	5	46.
1937	1	42.
1938	4	56.
1939	4	59.
1940	5	30.
1941	4	39.
1942	4	43.
1943	4	61.
1944	4	39.
1945	3	37.
1946	3	32.
1947	4	67.
1948	4	47.
1949	4	34.
1950	4	23.
1951	4	57.
1952	4	49.
1953	3	44.

STATION:02EA005
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1954	4	45.
1955	4	48.
1956	4	25.
1957	7	58.
1958	4	22.
1959	4	67.
1960	4	54.
1961	4	27.
1962	4	33.
1963	4	40.
1964	4	36.
1965	5	43.
1966	4	42.
1967	4	35.
1968	4	47.
1969	4	41.
1970	4	45.
1971	4	48.
1972	5	49.
1973	4	37.
1974	4	47.
1975	4	45.
1976	4	60.
1977	4	35.
1978	4	39.
1979	3	39.
1980	4	71.
1981	4	51.
1982	4	66.

STATION:02EA006
AREA: 650.
REGULATION: R1

YEAR	MO	FLOW
1916	4	48.
1917	4	55.
1918	4	37.
1919	4	40.
1920	4	40.
1921	3	72.
1922	4	84.
1923	4	76.
1924	4	32.
1925	4	39.
1926	5	65.
1927	3	23.
1928	4	109.
1929	4	87.
1930	4	38.
1931	4	28.
1932	4	39.
1933	4	64.
1934	5	49.
1935	4	27.
1936	5	57.
1937	4	41.
1938	4	66.
1939	4	74.
1940	5	35.
1941	4	70.
1942	4	53.
1943	5	73.
1944	4	39.
1945	3	51.
1946	3	43.
1947	4	81.
1948	4	53.
1949	4	49.
1950	4	29.
1951	4	84.
1952	4	58.
1953	3	47.

STATION:02EA006
(CONTINUED)
REGULATION: R1

YEAR	MO	FLOW
1954	4	52.
1955	4	59.
1956	4	28.
1957	7	35.
1958	4	32.
1959	4	68.
1960	4	70.
1961	4	33.
1962	5	33.
1963	4	39.
1964	4	35.
1965	5	49.
1966	12	30.
1967	4	43.
1968	4	36.
1969	4	39.
1970	4	48.
1971	4	53.
1972	5	60.
1973	4	47.
1974	4	54.
1975	5	58.
1976	4	81.
1977	4	60.
1978	5	43.
1979	4	49.
1980	4	61.
1981	4	47.
1982	4	51.

STATION:02EA008
AREA: 7850.
NATURAL FLOW

YEAR	MO	FLOW
1946	3	127.
1947	4	199.
1948	4	125.
1949	4	136.
1950	3	89.
1951	4	183.
1952	4	136.
1953	3	120.
1954	4	136.
1955	4	147.
1956	4	90.
1957	3	40.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02EA010
AREA: 149.
NATURAL FLOW

YEAR	MO	FLOW
1968	4	38.
1969	4	28.
1970	7	31.
1971	4	24.
1972	5	38.
1973	4	24.
1974	4	40.
1975	4	24.
1976	3	38.
1977	3	28.
1978	4	23.
1979	3	31.
1980	4	49.
1981	4	32.
1982	4	52.

STATION:02EA011
AREA: 2850.
REGULATION: R

YEAR	MO	FLOW
1974	4	249.
1975	5	255.
1976	4	331.
1977	4	227.
1978	4	182.
1979	4	266.
1980	4	248.
1981	4	195.
1982	4	248.

STATION:02EA012
AREA: 235.
NATURAL FLOW

YEAR	MO	FLOW
1974	4	48.
1975	4	38.
1976	4	37.
1977	4	22.
1978	4	28.

STATION:02EA013
AREA: 35.50
NATURAL FLOW

YEAR	MO	FLOW
1976	4	49.
1977	4	29.
1978	4	22.
1979	4	30.
1980	4	38.
1981	4	30.
1982	4	37.

STATION:02EB002
AREA: 1730.
REGULATION: R3

YEAR	MO	FLOW
1915	12	20.
1916	4	129.
1917	5	104.
1918	4	90.
1919	4	95.
1920	4	66.
1921	4	136.
1922	4	138.
1923	5	100.
1924	5	110.
1925	4	88.
1926	11	91.
1927	5	66.
1928	4	155.
1929	5	124.

STATION:02EB003
AREA: 1710.
REGULATION: R3

YEAR	MO	FLOW
1932	11	87.
1933	4	102.
1934	5	72.
1935	6	75.
1936	5	95.
1937	5	86.
1938	3	125.
1939	5	102.
1940	5	73.
1941	4	84.
1942	5	86.
1943	5	112.
1944	4	38.
1945	4	84.
1946	3	67.
1947	5	109.
1948	4	94.

STATION:02EB004
AREA: 1390.
REGULATION: R3

YEAR	MO	FLOW
1916	4	141.
1917	4	142.
1918	4	92.
1919	4	106.
1920	4	116.
1921	3	152.
1922	4	160.
1923	5	135.
1924	5	94.
1925	4	99.
1926	5	149.
1927	4	82.
1928	4	238.
1929	4	158.
1930	4	124.
1931	4	124.
1932	4	102.
1933	4	156.
1934	4	110.
1935	4	78.
1936	5	130.
1937	4	107.
1938	4	151.
1939	5	162.
1940	5	109.
1941	4	173.
1942	4	117.
1943	5	160.
1944	4	106.
1945	3	130.
1946	3	108.
1947	4	169.
1948	3	119.

STATION:02EB004
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1949	4	115.
1950	4	74.
1951	4	164.
1952	4	123.
1953	3	122.
1954	4	135.
1955	4	149.
1956	5	174.
1957	7	151.
1958	4	69.
1959	4	140.
1960	4	156.
1961	4	108.
1962	4	92.
1963	4	106.
1964	4	89.
1965	5	115.
1966	12	103.
1967	11	117.
1968	4	107.
1969	4	110.
1970	4	130.
1971	4	150.
1972	4	129.
1973	4	118.
1974	4	160.
1975	5	147.
1976	4	167.
1977	4	116.
1978	5	115.
1979	4	133.
1980	4	200.
1981	9	174.
1982	4	145.

STATION:02EB005
AREA: 4840.
REGULATION: R3

YEAR	MO	FLOW
1924	5	204.
1925	4	226.
1926	5	256.
1927	5	183.
1928	4	370.
1929	4	330.
1930	4	211.
1931	4	189.
1932	11	216.
1933	4	275.
1934	4	221.
1935	6	168.
1936	5	319.
1937	4	232.

STATION:02EB006
AREA: 4770.
REGULATION: R3

YEAR	MO	FLOW
1938	4	329.
1939	5	317.
1940	6	196.
1941	4	297.
1942	4	264.
1943	5	341.
1944	5	159.
1945	4	282.
1946	3	267.
1947	5	354.
1948	4	296.
1949	4	290.
1950	1	203.
1951	4	369.
1952	4	279.
1953	4	256.
1954	10	276.
1955	4	281.
1956	5	262.
1957	7	325.
1958	1	240.
1959	5	304.
1960	4	341.
1961	5	247.
1962	4	170.
1963	4	235.
1964	5	128.
1965	5	225.
1966	12	341.
1967	11	296.
1968	4	218.
1969	5	278.
1970	4	248.
1971	4	291.
1972	4	255.
1973	4	294.
1974	4	295.
1975	5	295.
1976	4	359.
1977	4	254.
1978	5	211.
1979	4	323.
1980	4	378.
1981	3	301.
1982	4	305.

STATION:02EB007
AREA: 1440.
REGULATION: R3

YEAR	MO	FLOW
1940	5	98.
1941	4	168.
1942	4	115.
1943	5	169.
1944	4	103.
1945	3	128.
1946	3	107.
1947	4	166.
1948	4	124.
1949	4	117.
1950	4	77.
1951	4	166.
1952	4	129.
1953	3	125.
1954	4	132.
1955	4	154.
1956	5	167.
1957	7	153.
1958	4	67.
1959	4	143.
1960	4	157.
1961	4	122.
1962	4	95.

STATION:02EB008
AREA: 1390.
REGULATION: R3

YEAR	MO	FLOW
1942	5	81.
1943	5	109.
1944	5	26.
1945	4	75.
1946	4	56.
1947	5	104.
1948	4	79.
1949	4	72.
1950	2	62.
1951	4	117.
1952	4	84.
1953	4	75.
1954	10	88.
1955	4	88.
1956	5	83.
1957	7	128.
1958	1	69.
1959	5	91.
1960	4	121.
1961	5	57.
1962	5	34.
1963	4	59.
1964	4	39.
1965	10	83.
1966	12	94.
1967	11	78.
1968	2	51.
1969	5	102.
1970	7	93.
1971	4	79.
1972	5	93.
1973	4	79.
1974	4	105.
1975	5	83.
1976	4	116.
1977	4	65.
1978	5	70.
1979	4	97.
1980	4	125.
1981	9	81.
1982	5	100.

STATION:02EB011
AREA: UNCERTAIN
REGULATION: R

YEAR	MO	FLOW
1966	12	247.
1967	11	199.
1968	4	120.
1969	5	160.
1970	4	145.
1971	4	198.
1972	4	156.
1973	4	213.
1974	4	183.
1975	5	161.
1976	4	252.
1977	4	158.
1978	5	113.
1979	4	226.
1980	4	254.
1981	3	193.
1982	4	211.

STATION:02EB012
AREA: UNCERTAIN
REGULATION: R

YEAR	MO	FLOW
1967	4	114.
1968	2	108.
1969	4	144.
1970	4	125.
1971	5	125.
1972	5	131.
1973	5	138.
1974	5	145.
1975	5	139.
1976	4	110.
1977	3	123.
1978	5	125.
1979	2	129.
1980	4	114.
1981	9	120.
1982	5	117.

STATION:02EB013
AREA: 593.
NATURAL FLOW

YEAR	MO	FLOW
1974	4	96.
1975	4	79.
1976	4	103.
1977	3	65.
1978	4	70.
1979	3	103.
1980	4	150.
1981	9	159.
1982	4	143.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02EC002
AREA: 1520.
NATURAL FLOW

YEAR	MO	FLOW
1916	4	140.
1917	4	144.
1918	4	146.
1919	3	127.
1920	3	138.
1921	3	141.
1922	4	167.
1923	5	151.
1924	4	101.
1925	3	129.
1926	4	130.
1927	3	122.
1928	4	229.
1929	4	152.
1930	4	105.
1931	4	79.
1932	4	107.
1933	4	88.
1934	4	110.
1935	3	109.
1936	3	136.
1937	4	78.
1938	3	166.
1939	4	131.
1940	4	102.
1941	4	100.
1942	3	99.
1943	4	154.
1944	4	88.
1945	3	153.
1946	3	112.
1947	4	104.
1948	3	170.
1949	3	138.
1950	4	116.
1951	4	144.
1952	4	144.
1953	3	121.
1954	10	146.
1955	4	121.
1956	4	106.
1957	7	123.
1958	1	50.
1959	4	133.
1960	4	163.
1961	4	75.

STATION:02EC002 (CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1962	3	107.
1963	4	121.
1964	4	60.
1965	4	140.
1966	12	128.
1967	4	117.
1968	4	118.
1969	4	113.
1970	4	123.
1971	4	158.
1972	4	173.
1973	3	153.
1974	4	140.
1975	4	150.
1976	4	200.
1977	3	130.
1978	4	106.
1979	3	148.
1980	4	138.
1981	2	158.
1982	4	190.

STATION:02EC003
AREA: 5850.
REGULATION: R3

YEAR	MO	FLOW
1965	4	200.
1966	12	209.
1967	7	213.
1968	4	189.
1969	5	227.
1970	4	249.
1971	4	256.
1972	4	263.
1973	4	210.
1974	4	247.
1975	4	224.
1976	3	238.
1977	3	185.
1978	4	180.
1979	3	219.
1980	4	244.
1981	2	220.
1982	4	220.

STATION:02EC004
AREA: 3700.
REGULATION: R3

YEAR	MO	FLOW
1963	6	44.
1964	11	30.
1965	5	71.
1966	1	47.
1967	7	122.
1968	1	91.
1969	5	87.
1970	4	66.
1971	4	64.
1972	5	91.
1973	4	109.
1974	4	96.
1975	5	107.
1976	3	82.
1977	12	56.
1978	5	93.
1979	5	112.
1980	4	121.
1981	3	89.
1982	6	88.

STATION:02EC008
AREA: 311.
REGULATION: R

YEAR	MO	FLOW
1965	2	49.
1966	3	9.
1967	6	29.
1968	3	29.
1969	3	27.

STATION:02EC009
AREA: 181.
NATURAL FLOW

YEAR	MO	FLOW
1966	3	22.
1967	6	44.
1968	2	24.
1969	3	19.
1970	4	14.
1971	4	21.
1972	4	38.
1973	2	36.
1974	3	44.
1975	2	88.
1976	3	35.
1977	8	46.
1978	4	37.
1979	3	32.
1980	3	30.
1981	2	28.
1982	3	46.

STATION:02EC010
AREA: 51.30
NATURAL FLOW

YEAR	MO	FLOW
1967	12	11.
1968	2	14.
1969	3	13.
1970	4	7.
1971	4	6.
1972	4	13.
1973	3	8.
1974	3	12.
1975	2	15.
1976	3	7.
1977	3	10.
1978	4	9.
1979	3	9.
1980	4	11.
1981	2	6.
1982	3	13.

STATION:02EC011
AREA: 282.
NATURAL FLOW

YEAR	MO	FLOW
1967	12	23.
1968	3	47.
1969	3	45.
1970	4	55.
1971	4	39.
1972	4	53.
1973	3	51.
1974	3	75.
1975	4	59.
1976	3	70.
1977	3	70.
1978	4	50.
1979	3	50.
1980	3	44.
1981	2	71.
1982	3	65.

STATION:02EC012
AREA: 324.
REGULATION: R2

YEAR	MO	FLOW
1970	4	28.
1971	4	23.
1972	4	67.
1973	3	26.
1974	3	45.
1975	2	51.
1976	3	33.
1977	3	34.
1978	4	37.
1979	3	28.
1980	3	25.
1981	2	45.
1982	4	55.

STATION:02EC101
AREA: 24.30
REGULATION: R1

YEAR	MO	FLOW
1971	6	4.53
1972	4	2.66
1973	3	3.82
1974	3	3.40
1975	3	5.10
1976	3	3.82
1977	3	1.53
1978	5	1.25
1979	3	3.27
1980	3	8.51
1981	2	1.59
1982	3	3.20

STATION:02EC103
AREA: 332.
NATURAL FLOW

YEAR	MO	FLOW
1970	4	22.
1971	4	20.
1972	4	57.
1973	3	21.
1974	3	44.
1975	2	48.
1976	3	37.
1977	3	56.
1978	4	36.
1979	3	47.
1980	3	68.
1981	2	70.
1982	4	66.

STATION:02E[illegible]003
AREA: 1180.
NATURAL FLOW

YEAR	MO	FLOW
1949	3	186.
1950	4	269.
1951	4	370.
1952	4	85.
1953	3	83.
1954	10	312.
1955	3	153.
1956	4	181.
1957	2	84.
1958	3	42.
1959	4	100.
1960	4	192.
1961	3	75.
1962	11	122.
1963	3	137.
1964	4	57.
1965	4	120.
1966	1	92.
1967	12	74.
1968	3	129.
1969	3	107.
1970	4	79.
1971	4	84.
1972	4	172.
1973	3	107.
1974	3	142.
1975	4	176.
1976	3	143.
1977	3	128.
1978	4	117.
1979	4	89.
1980	3	114.
1981	2	152.
1982	3	164.

STATION:02ED004
AREA: 207.
REGULATION: R1

YEAR	MO	FLOW
1964	4	6.
1965	4	37.
1966	1	9.
1967	6	17.
1968	3	24.
1969	4	24.
1970	4	16.
1971	4	15.
1972	4	43.
1973	4	21.
1974	3	67.
1975	4	38.
1976	3	33.
1977	10	21.
1978	4	38.

STATION:02ED005
AREA: 295.
REGULATION: R1

YEAR	MO	FLOW
1964	4	24.
1965	4	50.
1966	3	24.
1967	7	129.
1968	3	52.
1969	5	48.
1970	4	56.
1971	4	38.
1972	4	54.
1973	4	42.
1974	4	55.
1975	4	82.
1976	3	104.
1977	3	58.
1978	4	38.
1979	3	50.
1980	3	74.
1981	2	54.
1982	3	90.

STATION:02ED007
AREA: 177.
NATURAL FLOW

YEAR	MO	FLOW
1966	12	29.
1967	6	31.
1968	4	31.
1969	5	37.
1970	4	31.
1971	4	23.
1972	4	42.
1973	3	30.
1974	4	31.
1975	4	57.
1976	3	34.
1977	3	47.
1978	4	17.
1979	3	26.
1980	3	44.
1981	2	31.
1982	4	25.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02ED009
AREA: 94.98
NATURAL FLOW

YEAR	MO	FLOW
1973	3	24.
1974	4	27.
1975	4	30.
1976	3	31.
1977	3	29.
1978	4	16.
1979	3	27.
1980	3	35.
1981	2	22.
1982	4	21.
1983	4	8.

STATION:02ED010
AREA: 127.
NATURAL FLOW

YEAR	MO	FLOW
1973	3	14.
1974	3	12.
1975	4	18.
1976	3	17.
1977	3	20.
1978	4	11.
1979	3	15.
1980	3	18.
1981	2	15.
1982	4	14.

STATION:02ED011
AREA: 168.
NATURAL FLOW

YEAR	MO	FLOW
1974	3	25.
1975	4	48.
1976	3	41.
1977	3	41.
1978	4	22.
1979	12	28.
1980	3	34.
1981	2	33.
1982	3	36.

STATION:02ED106
AREA: 86.
REGULATION: R2

YEAR	MO	FLOW
1969	3	11.
1970	4	7.
1971	4	8.
1972	4	20.
1973	1	9.
1974	3	23.
1975	4	16.
1976	3	10.
1977	3	14.
1978	4	15.
1979	3	26.
1980	3	11.
1981	2	10.
1982	3	15.

STATION:02ED101
AREA: 334.
NATURAL FLOW

YEAR	MO	FLOW
1969	3	39.
1970	4	31.
1971	4	23.
1972	4	33.
1973	3	33.
1974	3	63.
1975	4	37.
1976	3	33.
1977	3	38.
1978	4	27.

STATION:02ED102
AREA: 211.
NATURAL FLOW

YEAR	MO	FLOW
1969	4	23.
1970	4	41.
1971	4	40.
1972	4	45.
1973	3	38.
1974	3	96.
1975	4	122.
1976	3	91.
1977	3	46.
1978	4	25.
1979	12	30.
1980	3	36.
1981	2	24.
1982	4	71.

STATION:02ED103
AREA: 195.
NATURAL FLOW

YEAR	MO	FLOW
1969	4	22.
1970	4	15.
1971	4	24.
1972	4	20.
1973	4	16.
1974	3	38.
1975	4	24.
1976	3	39.
1977	3	19.
1978	4	12.
1979	4	33.
1980	3	53.
1981	2	13.
1982	3	26.

STATION:02FA001
AREA: 927.
NATURAL FLOW

YEAR	MO	FLOW
1958	3	60.
1959	4	144.
1960	4	160.
1961	3	87.
1962	3	126.
1963	3	102.
1964	3	60.
1965	4	160.
1966	2	172.
1967	4	183.
1968	2	99.
1969	4	104.
1970	4	122.
1971	4	126.
1972	4	148.
1973	1	86.
1974	4	89.
1975	4	135.
1976	3	154.
1977	3	203.
1978	4	92.
1979	3	116.
1980	3	87.
1981	2	148.
1982	4	168.

STATION:02FA002
AREA: 50.50
NATURAL FLOW

YEAR	MO	FLOW
1976	3	16.
1977	3	24.
1978	4	11.
1979	4	13.
1980	3	11.
1981	2	15.
1982	3	21.
1983	5	16.

STATION:02FB001
AREA: 254.
REGULATION: R3

YEAR	MO	FLOW
1921	3	32.
1922	4	15.
1923	5	19.
1924	4	17.
1925	3	10.
1926	5	25.
1927	3	11.
1928	4	23.
1929	4	45.
1930	4	14.
1931	11	10.
1932	4	16.
1933	4	17.
1934	4	6.
1935	3	10.
1936	3	5.
1937	4	7.
1938	3	12.
1939	4	11.
1940	4	7.
1941	4	6.
1942	3	27.
1943	5	20.
1944	4	6.
1945	7	19.
1946	3	8.
1947	4	28.
1948	3	17.
1949	3	11.
1950	4	24.
1951	4	22.

STATION:02FB003
AREA: 262.
REGULATION: R3

YEAR	MO	FLOW
1916	4	27.
1917	4	22.
1918	4	28.
1919	3	19.
1920	3	19.
1921	3	35.
1922	4	27.
1923	5	28.
1924	4	35.
1925	3	21.
1926	5	31.
1927	3	17.
1928	4	49.
1929	4	55.
1930	2	25.
1931	4	9.
1932	4	18.
1933	4	14.
1934	4	14.
1935	3	24.
1936	3	11.
1937	2	24.
1938	3	19.
1939	4	15.
1940	4	16.
1941	10	18.
1942	3	26.
1943	4	23.
1944	4	11.
1945	7	17.
1946	3	17.
1947	4	31.
1948	3	20.
1949	12	22.
1950	4	12.
1951	4	29.

STATION:02FB007
AREA: 181.
NATURAL FLOW

YEAR	MO	FLOW
1946	3	33.
1947	4	99.
1948	3	80.
1949	3	29.
1950	3	62.
1951	3	27.
1952	4	26.
1953	7	13.
1954	10	60.
1955	3	23.
1956	4	48.
1957	12	19.
1958	3	11.
1959	4	28.
1960	4	49.
1961	12	27.
1962	3	47.
1963	3	44.
1964	3	22.
1965	4	50.
1966	2	28.
1967	4	36.
1968	2	47.
1969	4	40.
1970	4	27.
1971	4	25.
1972	4	45.
1973	1	27.
1974	4	33.
1975	4	60.
1976	3	46.
1977	3	55.
1978	4	21.
1979	12	33.
1980	3	32.
1981	2	36.
1982	4	57.

STATION:02FB009
AREA: 572.
REGULATION: R3

YEAR	MO	FLOW
1961	3	31.
1962	12	45.
1963	3	54.
1964	3	19.
1965	4	60.
1966	2	69.
1967	7	54.
1968	2	79.
1969	4	46.
1970	4	48.
1971	3	54.
1972	4	59.
1973	3	46.
1974	4	80.
1975	4	82.
1976	3	69.
1977	3	96.
1978	4	45.
1979	4	67.
1980	3	65.
1981	2	63.
1982	3	73.

STATION:02FB010
AREA: 293.
REGULATION: R1

YEAR	MO	FLOW
1958	4	19.
1959	4	45.
1960	4	83.
1961	3	48.
1962	3	61.
1963	3	123.
1964	3	39.
1965	4	62.
1966	2	102.
1967	4	64.
1968	2	78.
1969	4	44.
1970	4	51.
1971	4	56.
1972	4	60.
1973	1	46.
1974	4	79.
1975	4	101.
1976	3	132.
1977	3	123.
1978	4	46.
1979	4	61.
1980	7	89.
1981	2	103.
1982	3	116.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02FC001
AREA: 3960.
NATURAL FLOW

YEAR	MO	FLOW
1916	4	608.
1917	3	687.
1918	3	592.
1919	3	724.
1920	3	573.
1921	3	515.
1922	3	473.
1923	4	998.
1924	4	463.
1925	3	359.
1926	4	569.
1927	3	464.
1928	4	622.
1929	4	1010.
1930	4	246.
1931	4	197.
1932	4	422.
1933	4	339.
1934	4	414.
1935	3	511.
1936	3	498.
1937	4	736.
1938	3	578.
1939	4	410.
1940	4	522.
1941	4	562.
1942	3	1162.
1943	4	620.
1944	3	352.
1945	3	511.
1946	3	551.
1947	4	1040.
1948	3	876.
1949	3	532.

STATION:02FC001
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1950	4	733.
1951	3	588.
1952	4	419.
1953	7	325.
1954	10	932.
1955	3	378.
1956	4	697.
1957	12	377.
1958	3	225.
1959	4	580.
1960	4	722.
1961	3	328.
1962	3	569.
1963	3	883.
1964	3	317.
1965	4	753.
1966	2	402.
1967	4	665.
1968	2	784.
1969	4	532.
1970	4	586.
1971	4	507.
1972	12	680.
1973	1	602.
1974	3	450.
1975	4	694.
1976	3	895.
1977	3	1100.
1978	4	371.
1979	4	572.
1980	3	412.
1981	2	912.
1982	3	750.

STATION:02FC002
AREA: 2150.
NATURAL FLOW

YEAR	MO	FLOW
1916	4	246.
1917	3	395.
1918	4	283.
1919	3	321.
1920	3	321.
1921	3	365.
1922	4	246.
1923	5	521.
1924	5	355.
1925	3	231.
1926	4	377.
1927	3	300.
1928	4	446.
1929	4	633.
1930	4	185.
1931	4	155.
1932	4	217.
1933	4	256.
1934	4	238.
1935	3	271.
1936	3	191.
1937	4	215.
1938	3	456.
1939	4	306.
1940	4	310.
1941	4	270.
1942	3	424.
1943	4	654.
1944	4	281.
1945	3	422.
1946	3	294.
1947	4	774.
1948	3	249.
1949	12	500.

STATION:02FC002
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1950	4	711.
1951	1	311.
1952	4	292.
1953	3	153.
1954	10	526.
1955	4	220.
1956	4	409.
1957	12	219.
1958	4	112.
1959	4	309.
1960	4	428.
1961	3	137.
1962	3	311.
1963	3	382.
1964	4	153.
1965	4	282.
1966	12	205.
1967	4	317.
1968	2	263.
1969	4	248.
1970	4	289.
1971	4	311.
1972	4	419.
1973	3	219.
1974	3	343.
1975	4	538.
1976	3	399.
1977	3	507.
1978	4	260.
1979	4	442.
1980	3	257.
1981	2	358.
1982	4	339.

STATION:02FC004
AREA: 249.
NATURAL FLOW

YEAR	MO	FLOW
1916	4	16.
1917	4	14.
1918	4	17.
1919	3	19.
1920	3	22.
1921	3	26.
1922	4	14.
1923	4	19.
1924	4	15.
1925	3	14.
1926	4	23.
1927	3	14.
1928	4	27.
1929	4	49.
1930	2	19.
1931	4	7.
1932	2	29.
1933	4	17.
1934	4	13.
1935	3	19.
1936	5	12.
1937	2	17.
1938	3	22.
1939	4	15.
1940	4	19.

STATION:02FC011
AREA: 163.
NATURAL FLOW

YEAR	MO	FLOW
1954	10	51.
1955	3	29.
1956	4	37.
1957	12	27.
1958	3	10.
1959	4	34.
1960	4	34.
1961	2	12.
1962	3	28.
1963	3	26.
1964	8	34.
1965	4	28.
1966	2	19.
1967	4	26.
1968	2	36.
1969	4	28.
1970	4	23.
1971	4	21.
1972	4	33.
1973	1	25.
1974	4	35.
1975	4	82.
1976	3	56.
1977	3	75.
1978	4	22.
1979	4	65.
1980	2	40.
1981	2	35.
1982	3	60.

STATION:02FC012
AREA: 635.
REGULATION: R2
NATURAL FLOW

YEAR	MO	FLOW
1972	4	213.
1973	3	105.
1974	3	150.
1975	4	251.
1976	3	211.
1977	3	251.
1978	4	136.
1979	4	210.
1980	3	136.
1981	2	134.
1982	4	152.

STATION:02FC013
AREA: 262.
REGULATION: R2
NATURAL FLOW

YEAR	MO	FLOW
1972	12	39.
1973	1	29.
1974	4	39.
1975	4	43.
1976	3	33.
1977	3	69.
1978	4	25.
1979	4	32.

STATION:02FC014
AREA: 381.
REGULATION: R
NATURAL FLOW

YEAR	MO	FLOW
1972	4	106.
1973	3	55.
1974	4	80.
1975	4	101.
1976	3	76.
1977	3	101.

STATION:02FC015
AREA: 663.
NATURAL FLOW

YEAR	MO	FLOW
1972	4	105.
1973	1	75.
1974	3	80.
1975	4	109.
1976	3	136.
1977	3	142.
1978	4	70.
1979	3	82.
1980	4	81.
1981	2	133.
1982	3	119.

STATION:02FC016
AREA: 329.
NATURAL FLOW

YEAR	MO	FLOW
1976	12	4.
1977	3	126.
1978	4	80.
1979	4	92.
1980	3	71.
1981	2	98.
1982	4	87.

STATION:02FD001
AREA: 154.
NATURAL FLOW

YEAR	MO	FLOW
1974	4	104.
1975	12	75.
1976	3	123.
1977	3	196.
1978	4	39.
1979	3	127.
1980	3	76.
1981	2	67.
1982	3	92.
1983	12	21.

STATION:02FE002
AREA: 1630.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1953	3	188.
1954	10	543.
1955	3	376.
1956	4	489.
1957	12	295.
1958	3	142.
1959	4	470.
1960	4	583.
1961	3	146.
1962	3	613.
1963	3	631.
1964	12	189.
1965	2	371.
1966	3	256.
1967	3	221.
1968	2	490.
1969	4	371.
1970	4	276.
1971	4	257.
1972	4	388.
1973	1	240.
1974	5	394.
1975	4	776.
1976	3	685.
1977	3	739.
1978	4	314.
1979	4	565.
1980	3	349.
1981	2	533.
1982	4	594.

STATION:02FE003
AREA: 77.70
REGULATION: R2
NATURAL FLOW

YEAR	MO	FLOW
1953	5	22.
1954	3	63.
1955	3	38.
1956	4	48.
1957	2	26.
1958	3	7.
1959	4	31.
1960	4	34.
1961	12	8.
1962	3	41.
1963	3	22.
1964	4	16.
1965	2	34.
1966	12	26.
1967	4	33.
1968	2	44.
1969	4	35.
1970	4	33.
1971	4	27.
1972	4	46.
1973	3	26.
1974	5	50.
1975	4	79.
1976	3	69.
1977	3	63.
1978	4	38.
1979	4	57.
1980	3	56.
1981	2	35.
1982	3	59.

STATION:02FE004
AREA: 1760.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1946	3	472.
1947	4	866.
1948	3	1119.
1949	3	518.
1950	4	712.
1951	1	392.
1952	4	287.
1953	5	213.
1954	10	657.
1955	3	334.
1956	4	446.
1957	12	333.
1958	3	149.
1959	4	482.
1960	4	762.
1961	3	123.
1962	3	483.
1963	3	561.
1964	3	183.
1965	4	318.
1966	12	337.
1967	3	432.
1968	2	640.
1969	4	456.
1970	4	286.
1971	4	257.
1972	4	413.
1973	1	248.
1974	5	416.
1975	4	816.
1976	3	694.
1977	3	773.
1978	4	323.
1979	4	546.
1980	3	336.
1981	2	541.

STATION:02FE005
AREA: 528.
REGULATION: R2
NATURAL FLOW

YEAR	MO	FLOW
1953	3	134.
1954	10	353.
1955	4	112.
1956	4	255.
1957	2	205.
1958	3	41.
1959	4	298.
1960	4	284.
1961	2	30.
1962	3	139.
1963	3	184.
1964	3	54.
1965	4	88.
1966	12	97.
1967	4	105.
1968	2	241.
1969	4	129.
1970	4	102.
1971	4	85.
1972	4	190.
1973	1	83.
1974	5	200.
1975	4	374.
1976	3	282.
1977	3	311.
1978	4	99.
1979	4	222.
1980	3	140.
1981	2	167.
1982	4	245.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02FE007
AREA: 326.
REGULATION: 02

YEAR	MO	FLOW
1968	2	118.
1969	4	124.
1970	4	56.
1971	4	58.
1972	4	75.
1973	3	49.
1974	5	111.
1975	4	129.
1976	3	192.
1977	3	201.
1978	4	94.
1979	4	152.
1980	3	73.
1981	2	97.
1982	4	138.

STATION:02FE008
AREA: 648.
NATURAL FLOW

YEAR	MO	FLOW
1971	4	127.
1972	4	159.
1973	3	90.
1974	3	142.
1975	4	252.
1976	3	233.
1977	3	386.
1978	4	152.
1979	4	188.
1980	3	138.
1981	2	220.
1982	4	220.

STATION:02FE009
AREA: 376.
NATURAL FLOW

YEAR	MO	FLOW
1971	4	63.
1972	12	81.
1973	1	71.
1974	5	88.
1975	4	179.
1976	3	128.
1977	3	163.
1978	4	99.
1979	4	90.
1980	3	91.
1981	2	101.
1982	3	152.

STATION:02FE010
AREA: 197.
NATURAL FLOW

YEAR	MO	FLOW
1968	11	30.
1969	4	58.
1970	4	60.
1971	4	43.
1972	4	59.
1973	3	35.
1974	3	58.
1975	4	82.
1976	3	98.
1977	3	109.
1978	4	56.

STATION:02FF002
AREA: 865.
NATURAL FLOW

YEAR	MO	FLOW
1948	3	242.
1949	12	166.
1950	4	327.
1951	3	107.
1952	3	194.
1953	3	144.
1954	2	416.
1955	3	151.
1956	3	423.
1957	12	373.
1958	3	62.
1959	12	180.
1960	3	348.
1961	2	115.
1962	11	115.
1963	3	357.
1964	1	89.
1965	2	230.
1966	12	262.
1967	4	207.
1968	2	365.
1969	1	155.
1970	4	147.
1971	3	160.
1972	12	197.
1973	1	223.
1974	3	233.
1975	4	218.
1976	3	249.
1977	3	328.
1978	4	166.
1979	4	305.
1980	3	175.
1981	2	244.
1982	3	179.

STATION:02FF003
AREA: 124.
NATURAL FLOW

YEAR	MO	FLOW
1954	10	143.
1955	3	26.
1956	3	103.
1957	12	66.
1958	3	16.
1959	3	59.
1960	3	156.
1961	2	31.
1962	11	58.
1963	3	37.
1964	12	15.
1965	12	63.
1966	12	91.
1967	4	109.

STATION:02FF004
AREA: 41.40
NATURAL FLOW

YEAR	MO	FLOW
1966	12	25.
1967	4	22.
1968	2	17.
1969	1	15.
1970	4	33.
1971	4	41.
1972	4	41.
1973	3	18.
1974	3	33.
1975	4	35.
1976	3	31.
1977	3	22.
1978	3	27.
1979	4	24.
1980	3	26.
1981	2	25.
1982	3	42.

STATION:02FF006
AREA: 33.70
NATURAL FLOW

YEAR	MO	FLOW
1957	4	18.
1958	3	21.
1959	4	9.
1960	3	26.
1961	4	9.
1962	3	5.
1963	3	12.
1964	4	5.
1965	3	28.
1966	3	2.
1967	3	21.
1968	11	5.
1969	4	8.

STATION:02FF007
AREA: 466.
NATURAL FLOW

YEAR	MO	FLOW
1967	4	151.
1968	2	303.
1969	4	135.
1970	4	130.
1971	4	101.
1972	12	195.
1973	1	185.
1974	5	162.
1975	4	210.
1976	3	180.
1977	3	311.
1978	4	101.
1979	4	213.
1980	3	168.
1981	2	195.
1982	3	175.

STATION:02FF008
AREA: 124.
NATURAL FLOW

YEAR	MO	FLOW
1973	3	29.
1974	3	38.
1975	4	35.
1976	3	41.
1977	3	40.
1978	4	31.
1979	4	45.
1980	3	27.
1981	9	31.
1982	3	27.

STATION:02GA001
AREA: 760.
NATURAL FLOW

YEAR	MO	FLOW
1914	3	151.
1915	4	99.
1916	1	220.
1917	3	335.
1918	3	220.
1919	3	338.
1920	3	129.
1921	3	144.
1922	3	215.
1923	4	270.

STATION:02GA002
AREA: 1420.
NATURAL FLOW

YEAR	MO	FLOW
1914	3	399.
1915	9	224.
1916	1	372.
1917	3	354.
1918	3	259.
1919	3	409.
1920	3	208.
1921	3	340.
1922	4	261.
1923	4	269.

STATION:02GA003
AREA: 3520.
NATURAL FLOW

YEAR	MO	FLOW
1914	3	411.
1915	4	333.
1916	3	660.
1917	3	1156.
1918	3	561.
1919	3	1057.
1920	3	705.
1921	3	623.
1922	4	836.
1923	4	627.
1924	4	520.
1925	3	701.
1926	4	493.
1927	3	850.
1928	3	1098.
1929	4	1273.
1930	4	488.
1931	12	540.
1932	2	898.
1933	4	487.
1934	4	518.
1935	3	572.
1936	3	462.
1937	4	453.
1938	3	663.
1939	4	765.
1940	4	691.
1941	4	459.
1942	3	1020.

STATION:02GA003
AREA: 3520.
NATURL'ISD FLOW

YEAR	MO	FLOW
1943	4	1057.
1944	3	643.
1945	3	941.
1946	3	739.
1947	4	1374.
1948	3	1632.
1949	3	853.
1950	4	1017.
1951	3	858.
1952	4	606.
1953	5	385.
1954	10	677.
1955	3	480.
1956	5	801.
1957	12	346.
1958	3	284.
1959	4	932.
1960	4	1312.
1961	2	295.
1962	3	841.
1963	3	799.
1964	4	425.
1965	2	756.
1966	12	266.
1967	4	1048.
1968	11	414.
1969	4	674.
1970	4	507.
1971	4	606.
1972	4	918.
1973	3	799.
1974	5	1564.
1975	4	1662.
1976	3	1212.
1977	3	1144.
1978	4	754.
1979	4	1020.

STATION:02GA003
AREA: 3520.
REGULATION: 03

YEAR	MO	FLOW
1943	5	934.
1944	3	818.
1945	3	544.
1946	3	855.
1947	4	1170.
1948	3	1310.
1949	3	861.
1950	4	1090.
1951	3	674.
1952	4	490.
1953	5	541.
1954	10	1360.
1955	3	436.
1956	5	977.
1957	12	450.
1958	3	119.
1959	4	569.
1960	4	810.
1961	2	189.
1962	3	391.
1963	3	408.
1964	4	162.
1965	2	711.
1966	12	219.
1967	4	872.
1968	11	343.
1969	4	691.
1970	4	250.
1971	4	377.
1972	4	852.
1973	3	490.
1974	5	1550.
1975	4	852.
1976	3	592.
1977	3	575.
1978	4	453.
1979	4	756.
1980	3	540.
1981	2	415.
1982	4	672.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02GA008
AREA: 707.
REGULATION: R

YEAR	MO	FLOW
1914	3	65.
1915	9	72.
1916	3	98.
1917	3	119.
1918	3	120.
1919	3	201.
1920	3	95.
1921	3	83.
1922	4	121.

STATION:02GA010
AREA: 1030.
NATURAL FLOW

YEAR	MO	FLOW
1948	3	422.
1949	3	265.
1950	4	357.
1951	3	218.
1952	3	150.
1953	4	154.
1954	10	428.
1955	3	297.
1956	4	267.
1957	12	179.
1958	3	67.
1959	4	283.
1960	4	289.
1961	2	184.
1962	3	207.
1963	3	292.
1964	12	92.
1965	2	354.
1966	12	228.
1967	4	294.
1968	2	281.
1969	4	199.
1970	4	144.
1971	4	121.
1972	4	288.
1973	3	283.
1974	3	275.
1975	4	419.
1976	3	314.
1977	3	362.
1978	4	225.
1979	4	383.
1980	3	275.
1981	2	210.
1982	4	377.

STATION:02GA013
AREA: 821.
REGULATION: R3

YEAR	MO	FLOW
1948	3	809.
1949	12	569.
1950	4	671.
1951	3	396.
1952	4	261.
1953	5	275.
1954	10	1056.
1955	4	153.
1956	4	628.
1957	12	275.

STATION:02GA014
AREA: 694.
REGULATION: R3

YEAR	MO	FLOW
1966	1	149.
1967	4	206.
1968	11	160.
1969	4	161.
1970	4	204.
1971	4	204.
1972	4	388.
1973	3	165.
1974	4	191.
1975	4	331.
1976	3	328.
1977	3	292.
1978	4	202.
1979	4	280.
1980	3	215.
1981	2	200.
1982	3	294.

STATION:02GA015
AREA: 593.
NATURAL FLOW

YEAR	MO	FLOW
1951	3	107.
1952	4	61.
1953	5	68.
1954	10	163.
1955	3	84.
1956	5	148.
1957	4	51.
1958	4	18.
1959	4	95.
1960	4	85.
1961	2	50.
1962	3	61.
1963	3	85.
1964	12	29.
1965	4	98.
1966	12	32.
1967	4	136.
1968	8	51.
1969	4	54.
1970	4	46.
1971	4	48.
1972	4	106.
1973	3	83.
1974	5	166.
1975	4	127.
1976	3	50.
1977	3	52.
1978	4	34.
1979	4	63.
1980	3	51.
1981	2	28.
1982	4	70.

STATION:02GA016
AREA: 800.
REGULATION: R3

YEAR	MO	FLOW
1951	4	200.
1952	4	92.
1953	5	139.
1954	10	259.
1955	4	174.
1956	4	303.
1957	12	150.
1958	1	26.
1959	4	173.
1960	4	160.
1961	4	48.
1962	4	77.
1963	3	131.
1964	3	40.
1965	5	77.
1966	4	31.
1967	4	124.
1968	11	132.
1969	4	194.
1970	4	127.
1971	4	120.
1972	4	445.
1973	3	114.
1974	5	311.
1975	4	125.
1976	3	161.
1977	3	119.
1978	4	102.
1979	4	315.
1980	4	62.
1981	2	103.
1982	4	152.

STATION:02GA016
AREA: 800.
NATURAL FLOW

YEAR	MO	FLOW
1948	3	731.
1949	3	223.
1950	4	351.
1951	4	289.
1952	4	241.
1953	5	134.
1954	3	280.
1955	4	331.
1956	4	377.
1957	2	127.
1958	3	93.
1959	4	228.
1960	4	317.
1961	3	98.
1962	3	294.
1963	3	274.
1964	4	128.
1965	4	169.
1966	3	91.
1967	4	241.
1968	3	158.
1969	4	162.
1970	4	235.
1971	4	235.
1972	4	399.
1973	3	202.
1974	5	399.
1975	4	442.
1976	3	399.
1977	3	371.
1978	4	230.
1979	4	354.

STATION:02GA017
AREA: 324.
NATURAL FLOW

YEAR	MO	FLOW
1951	3	171.
1952	3	149.
1953	5	90.
1954	2	260.
1955	3	118.
1956	4	202.
1957	6	149.
1958	3	33.
1959	4	175.
1960	4	194.
1961	3	47.
1962	3	190.
1963	3	169.
1964	4	114.
1965	4	135.
1966	12	106.
1967	4	214.
1968	11	174.
1969	4	98.
1970	4	133.
1971	4	109.
1972	4	222.

STATION:02GA018
AREA: 552.
NATURAL FLOW

YEAR	MO	FLOW
1951	3	158.
1952	3	103.
1953	6	180.
1954	10	340.
1955	4	124.
1956	4	217.
1957	12	250.
1958	3	79.
1959	4	170.
1960	4	250.
1961	2	70.
1962	3	199.
1963	3	261.
1964	4	110.
1965	2	270.
1966	12	221.
1967	4	334.
1968	2	280.
1969	4	197.
1970	4	126.
1971	4	104.
1972	4	178.
1973	3	192.
1974	3	311.
1975	4	453.
1976	3	323.
1977	3	362.
1978	4	199.
1979	4	388.
1980	3	196.
1981	2	159.
1982	4	321.

STATION:02GA022
AREA: 655.
REGULATION: R2

YEAR	MO	FLOW
1953	5	88.
1954	10	289.
1955	4	144.
1956	4	212.
1957	12	142.
1958	3	53.
1959	4	150.
1960	4	213.
1961	4	128.
1962	3	177.
1963	3	195.
1964	4	126.

STATION:02GA023
AREA: 110.
REGULATION: R3

YEAR	MO	FLOW
1958	3	10.
1959	4	34.
1960	4	35.
1961	2	22.
1962	3	48.
1963	3	31.
1964	3	14.
1965	4	53.
1966	3	15.
1967	4	52.
1968	11	29.
1969	3	40.
1970	4	28.
1971	4	29.
1972	4	49.
1973	3	44.
1974	5	61.
1975	4	80.
1976	3	36.
1977	3	29.
1978	4	28.
1979	4	42.
1980	3	33.
1981	2	11.
1982	3	30.

STATION:02GA024
AREA: 59.60
REGULATION: R3

YEAR	MO	FLOW
1960	3	13.60
1961	2	18.
1962	6	10.20
1963	3	14.
1964	8	17.50
1965	2	45.
1966	12	6.57
1967	4	29.70
1968	8	37.10
1969	1	7.70
1970	8	7.79
1971	4	7.28
1972	6	13.40
1973	3	10.90
1974	5	16.20
1975	8	43.30
1976	7	17.80
1977	8	24.60
1978	9	10.70
1979	4	12.10
1980	3	17.
1981	2	9.76
1982	9	27.20

STATION:02GA028
AREA: 570.
REGULATION: R3

YEAR	MO	FLOW
1960	4	240.
1961	5	24.
1962	4	45.
1963	3	100.
1964	4	50.
1965	5	181.
1966	1	43.
1967	4	195.
1968	12	136.
1969	4	208.
1970	4	103.
1971	4	77.
1972	4	239.
1973	3	92.
1974	5	447.
1975	4	210.
1976	3	169.
1977	3	99.
1978	4	159.
1979	4	266.
1980	4	54.
1981	2	80.
1982	4	101.

STATION:02GA029
AREA: 236.
REGULATION: R2

YEAR	MO	FLOW
1964	3	11.
1965	2	20.
1966	12	11.
1967	4	39.
1968	8	23.
1969	4	19.
1970	4	15.
1971	4	17.
1972	4	38.
1973	3	30.
1974	5	43.
1975	4	48.
1976	3	34.
1977	3	45.
1978	4	25.
1979	4	34.
1980	3	41.
1981	2	20.
1982	4	47.

STATION:02GA030
AREA: 49.70
REGULATION: R1

YEAR	MO	FLOW
1966	12	4.
1967	6	7.
1968	3	10.
1969	4	6.
1970	4	3.
1971	4	9.
1972	4	6.
1973	3	19.
1974	3	11.
1975	2	14.
1976	3	8.
1977	3	13.
1978	4	6.
1979	3	21.
1980	3	22.
1981	2	9.
1982	3	17.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02GA031
AREA: 44.50
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1969	4	1.
1970	4	2.
1971	4	3.
1972	4	6.
1973	3	5.
1974	3	5.
1975	4	7.
1976	3	7.
1977	3	9.
1978	4	4.
1979	4	7.
1980	3	6.
1981	2	3.
1982	4	9.

STATION:02GA032
AREA: 2.51
NATURAL FLOW

YEAR	MO	FLOW
1970	12	.33
1971	4	1.01
1972	4	.94
1973	3	1.10
1974	5	2.07
1975	4	8.92
1976	3	5.56
1977	8	4.39
1978	5	2.61
1979	8	2.43
1980	5	1.91
1981	9	3.37
1982	12	4.24

STATION:02GA033
AREA: 44.80
REGULATION: R2
NATURAL FLOW

YEAR	MO	FLOW
1954	10	30.
1955	3	10.
1956	8	42.
1957	12	12.
1958	3	2.
1959	4	16.
1960	4	13.
1961	2	7.
1962	3	20.
1963	3	6.
1964	4	3.
1965	2	13.
1966	12	6.
1967	4	14.
1968	3	11.
1969	4	9.
1970	4	9.
1971	4	9.
1972	4	16.
1973	3	10.
1974	5	20.
1975	4	23.
1976	3	16.
1977	3	18.
1978	4	10.
1979	4	15.
1980	3	27.
1981	2	13.
1982	3	20.

STATION:02GA034
AREA: 1170.
REGULATION: R3
NATURAL FLOW

YEAR	MO	FLOW
1968	11	189.
1969	4	283.
1970	4	155.
1971	4	189.
1972	4	634.
1973	3	193.
1974	5	674.
1975	4	337.
1976	4	416.
1977	3	229.
1978	4	230.
1979	4	411.
1980	3	245.
1981	2	224.
1982	3	257.

STATION:02GA035
AREA: 27.70
NATURAL FLOW

YEAR	MO	FLOW
1971	4	6.57
1972	4	21.20
1973	3	26.70
1974	5	25.74
1975	4	20.
1976	3	14.
1977	3	12.50
1978	4	9.15
1979	4	13.10
1980	3	20.
1981	2	8.92
1982	3	17.90
1983	5	8.60

STATION:02GA036
AREA: 17.90
NATURAL FLOW

YEAR	MO	FLOW
1971	4	7.56
1972	4	19.40
1973	3	20.90
1974	5	24.
1975	4	27.60
1976	3	11.60
1977	3	14.90
1978	4	10.30
1979	4	11.10
1980	3	20.
1981	2	9.59
1982	3	26.16
1983	5	5.12

STATION:02GA037
AREA: 25.10
NATURAL FLOW

YEAR	MO	FLOW
1972	6	12.40
1973	7	7.16
1974	5	11.10
1975	8	24.70
1976	7	16.70
1977	8	23.90
1978	5	8.72
1979	8	12.10
1980	3	18.10
1981	9	17.00
1982	8	41.
1983	7	24.50

STATION:02GA038
AREA: 326.
NATURAL FLOW

YEAR	MO	FLOW
1972	4	142.
1973	3	141.
1974	5	282.
1975	4	289.
1976	3	262.
1977	3	226.
1978	4	135.
1979	4	279.
1980	3	268.
1981	2	135.
1982	3	260.

STATION:02GA039
AREA: 272.
NATURAL FLOW

YEAR	MO	FLOW
1973	3	129.
1974	5	294.
1975	4	388.
1976	3	306.
1977	3	256.
1978	4	175.
1979	4	176.
1980	3	185.
1981	2	131.
1982	3	230.

STATION:02GA040
AREA: 167.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1974	5	114.
1975	4	102.
1976	3	61.
1977	3	67.
1978	4	35.
1979	4	53.
1980	3	88.
1981	2	34.
1982	3	71.
1983	5	28.

STATION:02GB001
AREA: 5210.
REGULATION: R3
NATURAL FLOW

YEAR	MO	FLOW
1948	3	1550.
1949	3	1010.
1950	4	1430.
1951	3	872.
1952	4	591.
1953	5	566.
1954	10	1590.
1955	3	940.
1956	5	1250.
1957	12	659.
1958	3	199.
1959	4	698.
1960	4	1150.
1961	2	292.
1962	3	541.
1963	3	688.
1964	12	259.
1965	2	1090.
1966	12	385.
1967	4	988.
1968	11	419.
1969	4	731.
1970	4	362.
1971	4	467.
1972	4	1010.
1973	3	671.
1974	5	1780.
1975	4	1050.
1976	3	799.
1977	3	923.
1978	4	606.
1979	4	1330.
1980	3	881.
1981	2	638.
1982	4	1030.

STATION:02GB001
AREA: 5210.
NATURALISED FLOW

YEAR	MO	FLOW
1948	3	1731.
1949	3	844.
1950	4	1504.
1951	3	1024.
1952	4	722.
1953	5	527.
1954	10	1084.
1955	3	736.
1956	5	1147.
1957	12	575.
1958	3	320.
1959	4	1011.
1960	4	1572.
1961	2	399.
1962	3	980.
1963	3	1048.
1964	12	482.
1965	2	951.
1966	12	264.
1967	4	1033.
1968	11	521.
1969	4	688.
1970	4	498.
1971	4	688.
1972	4	1074.
1973	3	958.
1974	5	1833.
1975	4	1013.
1976	3	1479.
1977	3	1502.
1978	4	938.
1979	4	1492.

STATION:02GB002
AREA: 5910.
REGULATION: R3
NATURAL FLOW

YEAR	MO	FLOW
1914	3	928.
1915	9	406.
1916	3	821.
1917	3	856.
1918	3	832.
1919	3	1284.
1920	3	788.
1921	3	775.
1922	4	861.
1923	4	615.

STATION:02GB006
AREA: 150.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1954	2	75.
1955	3	43.
1956	5	57.
1957	12	30.
1958	3	6.
1959	4	33.
1960	4	43.
1961	2	28.
1962	3	28.
1963	3	42.
1964	12	20.
1965	2	78.
1966	12	34.
1967	12	42.
1968	2	58.
1969	2	26.
1970	4	16.
1971	4	50.
1972	4	31.
1973	3	25.
1974	1	11.
1975	2	30.
1976	3	21.
1977	3	41.
1978	4	31.
1979	4	49.
1980	3	36.
1981	2	30.
1982	4	47.

STATION:02GB007
AREA: 360.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1965	2	72.
1966	3	31.
1967	4	34.
1968	2	77.
1969	1	60.
1970	4	22.
1971	3	39.
1972	3	36.
1973	3	47.
1974	1	69.
1975	2	37.
1976	3	45.
1977	3	50.
1978	3	57.
1979	3	73.
1980	3	56.
1981	2	48.
1982	4	52.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02G8008
AREA: 383.
REGULATION: R1

YEAR	MO	FLOW
1962	3	33.
1963	3	54.
1964	4	15.
1965	2	92.
1966	12	40.
1967	4	74.
1968	2	58.
1969	1	65.
1970	4	24.
1971	4	49.
1972	3	42.
1973	3	55.
1974	5	79.
1975	2	45.
1976	3	60.
1977	3	63.
1978	4	49.
1979	4	73.
1980	3	66.
1981	2	43.
1982	4	85.

STATION:02G8009
AREA: 399.
NATURAL FLOW

YEAR	MO	FLOW
1962	3	31.
1963	3	19.
1964	4	14.
1965	12	59.
1966	12	24.
1967	4	32.
1968	2	67.
1969	1	89.
1970	4	15.
1971	3	30.
1972	3	42.
1973	3	27.
1974	4	31.
1975	2	24.
1976	3	48.
1977	3	44.
1978	3	31.
1979	4	75.
1980	3	35.
1981	8	60.
1982	4	48.

STATION:02G8010
AREA: 171.
REGULATION: R2

YEAR	MO	FLOW
1962	3	9.
1963	3	20.
1964	3	9.
1965	2	32.
1966	2	17.
1967	4	10.
1968	2	27.
1969	4	26.
1970	4	12.
1971	3	20.
1972	3	22.
1973	3	20.
1974	1	21.
1975	3	16.
1976	3	33.
1977	12	21.
1978	3	43.
1979	3	29.
1980	3	26.
1981	2	22.
1982	3	26.

STATION:02G8011
AREA: 29.
NATURAL FLOW

YEAR	MO	FLOW
1965	3	13.
1966	3	2.
1967	4	2.
1968	2	15.
1969	1	19.
1970	4	4.
1971	3	6.
1972	3	5.
1973	3	2.
1974	1	5.
1975	3	4.
1976	3	6.

STATION:02GC002
AREA: 329.
REGULATION: R2

YEAR	MO	FLOW
1967	12	121.
1968	2	275.
1969	1	155.
1970	4	124.
1971	2	94.
1972	4	142.
1973	3	161.
1974	1	110.
1975	2	114.
1976	3	195.
1977	3	193.
1978	3	99.
1979	4	194.
1980	3	164.
1981	2	79.
1982	3	109.

STATION:02GC004
AREA: 697.
REGULATION: R1

YEAR	MO	FLOW
1955	3	79.
1956	3	80.
1957	4	66.
1958	4	17.
1959	4	36.
1960	3	86.
1961	4	53.
1962	3	52.
1963	3	65.
1964	8	28.
1965	3	210.
1966	12	59.
1967	12	52.
1968	2	151.
1969	1	175.
1970	4	42.
1971	2	61.
1972	3	64.
1973	3	76.
1974	3	65.
1975	2	61.

STATION:02GC005
AREA: 54.40
REGULATION: R3

YEAR	MO	FLOW
1955	3	12.20
1956	3	16.65
1957	4	8.57
1958	4	5.76
1959	3	5.78
1960	3	44.99
1961	4	5.12
1962	3	6.17
1963	4	5.21
1964	8	2.54
1965	3	20.01
1966	2	3.02

STATION:02GC006
AREA: 343.
REGULATION: R2

YEAR	MO	FLOW
1956	3	59.
1957	4	35.
1958	4	10.
1959	3	27.
1960	3	98.
1961	4	11.
1962	3	29.
1963	3	23.
1964	4	11.
1965	3	140.
1966	12	25.
1967	4	27.
1968	2	61.
1969	1	62.
1970	4	14.
1971	3	26.
1972	4	28.
1973	3	38.
1974	1	43.
1975	3	24.
1976	3	63.
1977	3	34.
1978	3	44.
1979	4	53.
1980	3	45.
1981	2	32.
1982	4	50.

STATION:02GC007
AREA: 591.
REGULATION: R1

YEAR	MO	FLOW
1956	3	49.
1957	4	34.
1958	3	13.
1959	4	25.
1960	4	100.
1961	4	21.
1962	3	33.
1963	3	33.
1964	5	30.
1965	3	252.
1966	12	29.
1967	4	35.
1968	2	133.
1969	2	92.
1970	4	18.
1971	2	32.
1972	3	39.
1973	3	40.
1974	1	58.
1975	3	29.
1976	3	67.
1977	3	39.
1978	3	54.
1979	3	56.
1980	3	40.
1981	2	36.
1982	3	63.

STATION:02GC008
AREA: 134.
REGULATION: R2

YEAR	MO	FLOW
1958	2	8.
1959	3	26.
1960	3	33.
1961	2	13.
1962	3	37.
1963	3	25.
1964	8	11.
1965	3	60.
1966	2	9.
1967	4	7.
1968	2	29.
1969	1	27.
1970	4	5.
1971	2	20.
1972	3	25.
1973	3	10.
1974	3	13.
1975	2	10.
1976	3	22.
1977	9	24.
1978	3	22.
1979	3	18.
1980	3	17.
1981	2	13.
1982	3	22.

STATION:02GC010
AREA: 342.
REGULATION: R2

YEAR	MO	FLOW
1961	4	30.
1962	3	78.
1963	3	56.
1964	3	17.
1965	3	146.
1966	12	43.
1967	12	33.
1968	2	112.
1969	1	123.
1970	4	32.
1971	2	45.
1972	3	42.
1973	3	73.
1974	1	74.
1975	2	46.
1976	3	118.
1977	3	63.
1978	3	63.
1979	3	110.
1980	3	56.
1981	2	46.
1982	4	57.

STATION:02GC011
AREA: 142.
REGULATION: R1

YEAR	MO	FLOW
1964	4	4.
1965	2	54.
1966	12	16.
1967	4	26.
1968	2	53.
1969	1	62.
1970	4	12.
1971	3	26.
1972	3	21.
1973	3	28.
1974	1	45.
1975	3	22.
1976	3	51.
1977	3	28.
1978	3	37.

STATION:02GC012
AREA: 51.30
REGULATION: R1

YEAR	MO	FLOW
1964	8	2.
1965	3	14.
1966	2	2.
1967	4	2.
1968	2	6.
1969	1	7.
1970	4	4.
1971	2	5.
1972	3	7.
1973	3	3.
1974	3	4.
1975	2	3.
1976	3	6.
1977	9	5.
1978	3	5.
1979	3	5.
1980	3	5.
1981	2	5.
1982	3	7.

STATION:02GC013
AREA: 75.90
REGULATION: R2

YEAR	MO	FLOW
1964	3	7.
1965	3	21.
1966	2	10.
1967	4	6.
1968	2	11.
1969	1	24.
1970	11	6.
1971	3	6.
1972	3	17.
1973	3	9.
1974	5	11.
1975	2	9.
1976	3	21.
1977	9	41.
1978	3	23.
1979	12	16.
1980	7	34.
1981	2	6.
1982	3	18.

STATION:02GC014
AREA: 65.80
REGULATION: R2

YEAR	MO	FLOW
1967	11	4.
1968	2	6.
1969	1	10.
1970	11	2.
1971	2	4.
1972	3	11.
1973	3	4.
1974	3	4.
1975	9	4.
1976	3	9.
1977	9	13.
1978	3	10.

STATION:02GC015
AREA: 104.
REGULATION: R1

YEAR	MO	FLOW
1964	8	9.
1965	3	17.
1966	12	11.
1967	12	16.
1968	2	13.
1969	1	16.
1970	4	6.
1971	2	11.
1972	3	12.
1973	3	10.
1974	3	9.
1975	2	9.
1976	3	20.
1977	9	17.
1978	3	21.
1979	3	16.
1980	4	7.
1981	2	9.
1982	3	26.

STATION:02GC016
AREA: 109.
REGULATION: R1

YEAR	MO	FLOW
1965	3	37.
1966	12	11.
1967	12	8.
1968	2	19.
1969	1	28.
1970	4	6.
1971	2	12.
1972	3	23.
1973	3	12.
1974	3	12.
1975	2	9.
1976	3	29.
1977	4	23.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02GC017
AREA: 93.20
REGULATION: R2

YEAR	MO	FLOW
1965	2	30.
1966	12	16.
1967	4	24.
1968	2	39.
1969	1	32.
1970	4	8.
1971	3	10.
1972	3	17.
1973	3	26.
1974	1	33.
1975	2	11.
1976	3	31.
1977	3	26.
1978	3	14.
1979	4	18.
1980	3	17.
1981	8	17.
1982	3	31.

STATION:02GC018
AREA: 287.
NATURAL FLOW

YEAR	MO	FLOW
1965	3	145.
1966	12	59.
1967	4	110.
1968	2	144.
1969	1	133.
1970	4	93.
1971	2	113.
1972	3	90.
1973	3	130.
1974	1	92.
1975	1	73.
1976	3	148.
1977	3	130.
1978	3	146.
1979	4	147.
1980	3	127.
1981	2	80.
1982	3	151.

STATION:02GC021
AREA: 68.40
REGULATION: R

YEAR	MO	FLOW
1967	4	4.
1968	2	6.
1969	1	11.
1970	4	5.
1971	2	5.
1972	3	5.
1973	3	5.
1974	3	5.
1975	2	5.
1976	2	6.
1977	12	6.
1978	3	11.
1979	3	9.
1980	7	11.
1981	2	5.
1982	3	14.

STATION:02GC022
AREA: 101.
REGULATION: R3

YEAR	MO	FLOW
1972	4	18.
1973	3	24.
1974	2	26.
1975	3	22.
1976	3	51.
1977	9	60.
1978	3	32.
1979	8	29.
1980	3	31.
1981	2	26.
1982	3	30.

STATION:02GC023
AREA: 5.18
REGULATION: R

YEAR	MO	FLOW
1970	9	.06
1971	5	.67
1972	3	2.10
1973	10	.64
1974	6	.74
1975	8	.49

STATION:02GC024
AREA: 27.20
REGULATION: R

YEAR	MO	FLOW
1970	4	2.86
1971	2	5.97
1972	3	10.80
1973	3	6.63
1974	2	3.96
1975	6	3.
1976	3	11.43
1977	9	8.78
1978	3	12.60

STATION:02GC025
AREA: 10.10
REGULATION: R

YEAR	MO	FLOW
1970	4	.65
1971	2	1.04
1972	3	2.15
1973	3	1.28
1974	3	1.13
1975	8	.92

STATION:02GC026
AREA: 676.
NATURAL FLOW

YEAR	MO	FLOW
1976	3	124.
1977	3	80.
1978	3	110.
1979	3	156.
1980	3	90.
1981	2	80.
1982	3	138.
1983	8	84.

STATION:02GC202
AREA: 18.65
NATURAL FLOW

YEAR	MO	FLOW
1968	6	4.60
1969	11	.79
1970	4	1.46
1971	3	1.81
1972	4	5.49
1973	3	2.34
1974	3	1.69
1975	2	1.32
1976	3	1.97

STATION:02GC203
AREA: 5.96
NATURAL FLOW

YEAR	MO	FLOW
1968	6	1.57
1969	1	4.14
1970	12	.68
1971	2	1.35
1972	0	0.
1973	3	1.06
1974	0	0.
1975	2	1.25
1976	2	2.21

STATION:02GD001
AREA: 1340.
NATURAL FLOW

YEAR	MO	FLOW
1916	1	222.
1917	3	159.
1918	2	259.
1919	3	168.
1920	3	272.
1921	12	236.
1922	4	210.
1923	4	151.
1924	3	141.
1925	3	252.
1926	3	296.
1927	7	145.
1928	3	146.
1929	3	222.
1930	4	82.
1931	3	125.
1932	5	85.
1933	4	114.
1934	4	172.
1935	3	274.
1936	3	179.
1937	4	813.
1938	2	447.
1939	4	169.
1940	4	274.
1941	4	43.
1942	3	226.
1943	3	332.
1944	4	81.
1945	5	213.
1946	3	176.
1947	4	466.
1948	3	277.
1949	2	260.
1950	4	354.
1951	3	210.
1952	3	176.
1953	3	193.
1954	2	447.
1955	3	202.
1956	3	408.
1957	12	190.
1958	3	39.
1959	3	120.
1960	3	276.
1961	2	101.
1962	3	121.
1963	3	215.
1964	12	75.
1965	2	456.
1966	12	244.

STATION:02GD001
AREA: 1340.
REGULATION: R2

YEAR	MO	FLOW
1967	4	190.
1968	2	671.
1969	1	311.
1970	4	97.
1971	3	147.
1972	3	287.
1973	3	213.
1974	1	222.
1975	2	225.
1976	3	473.
1977	3	411.
1978	4	237.
1979	3	425.
1980	3	212.
1981	2	209.
1982	4	268.

STATION:02GD003
AREA: 1450.
NATURAL FLOW

YEAR	MO	FLOW
1916	1	414.
1917	3	480.
1918	3	238.
1919	3	245.
1920	3	171.
1921	12	379.
1922	2	413.
1923	5	280.
1924	3	208.
1925	3	500.
1926	4	484.
1927	7	270.
1928	3	436.
1929	3	598.
1930	2	548.
1931	3	321.
1932	4	130.
1933	4	276.
1934	4	486.
1935	11	480.
1936	3	201.
1937	4	718.
1938	2	482.
1939	4	349.
1940	4	503.
1941	4	114.
1942	3	497.
1943	5	416.
1944	4	317.

STATION:02GD003
AREA: 1450.
REGULATION: R3

YEAR	MO	FLOW
1954	2	538.
1955	3	412.
1956	5	377.
1957	12	351.
1958	3	106.
1959	4	374.
1960	4	425.
1961	2	172.
1962	3	163.
1963	3	654.
1964	12	189.
1965	4	485.
1966	12	416.
1967	4	374.
1968	2	530.
1969	4	331.
1970	4	337.
1971	4	328.
1972	4	274.
1973	3	280.
1974	3	351.
1975	4	515.
1976	3	343.
1977	3	569.
1978	4	354.
1979	4	523.
1980	3	303.
1981	2	365.
1982	4	529.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02GD004
AREA: 306.
REGULATION: R2

YEAR	NO	FLOW
1946	3	90.
1947	4	183.
1948	3	115.
1949	3	115.
1950	4	115.
1951	1	96.
1952	4	87.
1953	3	93.
1954	2	139.
1955	3	412.
1956	3	141.
1957	12	67.
1958	3	18.
1959	4	49.
1960	3	80.
1961	2	20.
1962	3	42.
1963	3	82.
1964	12	34.
1965	2	164.
1966	12	87.
1967	4	85.
1968	2	192.
1969	1	93.
1970	4	30.
1971	4	72.
1972	3	63.
1973	3	90.
1974	3	90.
1975	2	87.
1976	3	176.
1977	3	175.
1978	4	104.
1979	4	160.
1980	3	78.
1981	2	66.
1982	3	137.

STATION:02GD005
AREA: 1080.
REGULATION: R2

YEAR	NO	FLOW
1948	3	778.
1949	3	470.
1950	4	758.
1951	2	289.
1952	3	147.
1953	6	430.
1954	2	691.
1955	3	577.
1956	4	601.
1957	12	442.
1958	3	91.
1959	4	391.
1960	4	521.
1961	2	109.
1962	3	303.
1963	3	583.
1964	12	171.
1965	2	676.
1966	12	549.
1967	4	493.
1968	2	493.
1969	4	306.
1970	4	252.
1971	4	317.
1972	4	242.
1973	3	294.
1974	5	535.
1975	4	612.
1976	3	320.
1977	3	782.
1978	4	374.
1979	4	450.
1980	3	398.
1981	2	299.
1982	3	590.

STATION:02GD006
AREA: 554.
NATURAL FLOW

YEAR	NO	FLOW
1938	2	89.
1939	4	61.
1940	4	125.
1941	4	12.
1942	3	91.
1943	2	104.
1944	3	43.
1945	10	74.
1946	3	70.
1947	4	153.
1948	3	136.
1949	2	109.
1950	4	138.
1951	3	89.
1952	3	84.
1953	3	94.
1954	2	175.

STATION:02GD007
AREA: 1780.
REGULATION: R3

YEAR	NO	FLOW
1944	4	244.
1945	5	590.
1946	3	738.
1947	4	1020.
1948	3	809.
1949	3	500.
1950	4	821.
1951	1	680.
1952	3	259.
1953	3	227.
1954	2	785.
1955	3	484.
1956	5	625.
1957	12	610.
1958	3	109.
1959	4	413.
1960	4	580.
1961	2	221.
1962	3	306.

STATION:02GD008
AREA: 181.
REGULATION: R2

YEAR	NO	FLOW
1973	3	57.
1974	3	66.
1975	4	81.
1976	3	118.
1977	3	146.
1978	4	95.
1979	4	112.
1980	3	92.
1981	2	81.
1982	3	115.

STATION:02GD009
AREA: 140.
NATURAL FLOW

YEAR	NO	FLOW
1946	3	45.
1947	4	107.
1948	3	105.
1949	2	39.
1950	4	54.
1951	2	20.
1952	3	29.
1953	3	34.
1954	2	109.
1955	3	55.
1956	3	78.
1957	11	57.
1958	3	10.
1959	4	56.
1960	4	60.
1961	2	34.
1962	3	24.
1963	3	53.
1964	12	24.

STATION:02GD009
AREA: 140.
REGULATION: R3

YEAR	NO	FLOW
1965	2	47.
1966	11	28.
1967	4	22.
1968	2	22.
1969	3	11.
1970	12	11.
1971	4	10.
1972	4	14.
1973	3	12.
1974	5	26.
1975	7	50.
1976	3	15.
1977	3	19.
1978	4	30.
1979	4	26.
1980	1	9.
1981	11	10.
1982	4	25.

STATION:02GD010
AREA: 150.
NATURAL FLOW

YEAR	NO	FLOW
1946	3	53.
1947	4	131.
1948	3	62.
1949	2	74.
1950	4	88.
1951	2	37.
1952	3	44.
1953	3	32.
1954	2	125.
1955	3	56.
1956	3	66.
1957	12	38.
1958	3	8.
1959	10	44.
1960	4	63.
1961	2	24.
1962	3	17.
1963	3	64.
1964	12	29.
1965	2	76.
1966	12	68.
1967	4	60.
1968	2	87.
1969	1	46.
1970	5	35.
1971	4	41.
1972	12	43.
1973	3	44.
1974	3	73.
1975	4	134.
1976	3	54.
1977	3	150.
1978	4	52.
1979	4	72.
1980	3	61.
1981	2	60.
1982	3	69.

STATION:02GD011
AREA: 93.20
REGULATION: R2

YEAR	NO	FLOW
1952	3	17.
1953	3	33.
1954	2	34.
1955	3	19.
1956	3	41.
1957	4	19.
1958	3	7.
1959	4	30.
1960	3	60.
1961	2	12.
1962	3	13.
1963	3	16.
1964	0	6.
1965	2	42.
1966	12	16.
1967	12	27.
1968	2	60.
1969	1	30.
1970	4	10.
1971	3	18.
1972	3	21.
1973	3	21.
1974	1	22.
1975	2	22.
1976	3	60.
1977	3	26.
1978	3	19.
1979	3	56.
1980	3	24.
1981	2	15.
1982	3	54.

STATION:02GD012
AREA: 254.
REGULATION: R/R3

YEAR	NO	FLOW
1952	3	41.
1953	6	57.
1954	2	150.
1955	3	50.
1956	3	169.
1957	12	67.
1958	3	14.
1959	4	52.
1960	3	71.
1961	2	24.
1962	3	32.
1963	3	90.
1964	4	21.
(1965	3	99.)
1966	12	84.
1967	1	37.
1968	2	51.
1969	1	41.
1970	4	17.
1971	4	52.
1972	3	31.
1973	3	40.
1974	3	123.
1975	4	31.
1976	2	27.
1977	3	36.
1978	4	31.
1979	4	110.
1980	3	27.
1981	2	26.
1982	4	54.

STATION:02GD013
AREA: 38.90
NATURAL FLOW

YEAR	NO	FLOW
1974	3	23.
1975	4	16.
1976	3	63.
1977	3	43.
1978	4	27.
1979	4	20.
1980	7	43.
1981	2	18.
1982	12	23.
1983	5	11.

STATION:02GD014
AREA: 319.
REGULATION: R2

YEAR	NO	FLOW
1955	3	331.
1956	5	255.
1957	12	164.
1958	3	32.
1959	4	218.
1960	4	230.
1961	12	153.
1962	3	153.
1963	3	393.
1964	12	89.
1965	2	144.
1966	12	350.
1967	1	373.
1968	2	226.
1969	4	236.
1970	4	221.
1971	4	146.
1972	4	153.
1973	3	193.
1974	5	289.
1975	4	447.
1976	3	201.
1977	3	413.
1978	4	191.
1979	4	233.
1980	3	195.
1981	2	146.
1982	3	201.

STATION:02GD015
AREA: 1340.
REGULATION: R2

YEAR	NO	FLOW
1954	2	867.
1955	3	670.
1956	5	660.
1957	12	473.
1958	3	97.
1959	4	447.
1960	4	668.
1961	2	142.
1962	3	303.
1963	3	648.
1964	4	176.
1965	2	603.
1966	12	588.
1967	4	510.
1968	2	651.
1969	4	377.
1970	4	317.
1971	4	303.
1972	4	309.
1973	3	391.
1974	5	583.
1975	4	714.
1976	3	453.
1977	3	711.
1978	4	473.
1979	4	588.
1980	3	541.
1981	2	423.
1982	4	576.

STATION:02GD016
AREA: 518.
REGULATION: R3

YEAR	NO	FLOW
1957	12	67.
1958	3	18.
1959	4	67.
1960	3	155.
1961	2	40.
1962	3	67.
1963	3	89.
1964	12	31.
1965	2	194.
1966	12	88.
1967	4	53.
1968	2	146.
1969	1	92.
1970	4	28.
1971	3	41.
1972	3	59.
1973	3	59.
1974	3	59.
1975	2	69.
1976	3	108.
1977	3	96.
1978	4	79.
1979	4	133.
1980	3	75.
1981	2	69.
1982	4	83.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02GB018
AREA: 144.
REGULATION: R2

YEAR	MO	FLOW
1965	2	76.
1966	12	58.
1967	4	54.
1968	2	65.
1969	1	48.
1970	5	42.
1971	4	54.
1972	4	37.
1973	3	41.
1974	3	65.
1975	4	89.
1976	3	45.
1977	3	69.
1978	4	55.
1979	4	87.
1980	3	62.
1981	2	57.
1982	4	97.

STATION:02GB019
AREA: 36.
NATURAL FLOW

YEAR	MO	FLOW
1967	4	21.10
1968	2	22.30
1969	3	17.40
1970	4	18.60
1971	4	16.30
1972	4	16.50
1973	3	18.90
1974	3	19.80
1975	4	24.80
1976	3	19.90
1977	3	22.70
1978	4	17.40
1979	4	22.
1980	3	21.10
1981	2	15.90
1982	3	44.30

STATION:02GB020
AREA: 108.
NATURAL FLOW

YEAR	MO	FLOW
1966	12	30.
1967	4	26.
1968	2	67.
1969	1	52.
1970	4	15.
1971	4	21.
1972	3	42.
1973	3	35.
1974	3	35.
1975	2	41.
1976	3	70.
1977	3	46.
1978	4	35.
1979	4	35.
1980	7	27.
1981	2	26.
1982	3	48.

STATION:02GE002
AREA: 3110.
REGULATION: R2

YEAR	MO	FLOW
1955	3	896.
1956	3	954.
1957	12	663.
1958	3	151.
1959	4	566.
1960	3	898.
1961	2	273.
1962	3	286.
1963	3	688.
1964	4	245.
1965	2	816.
1966	12	665.
1967	4	575.
1968	2	977.
1969	1	646.
1970	4	385.
1971	4	487.
1972	3	493.
1973	3	561.
1974	3	651.
1975	4	719.
1976	3	818.
1977	3	966.
1978	4	637.
1979	4	809.
1980	3	586.
1981	2	654.
1982	4	834.

STATION:02GE003
AREA: 4300.
REGULATION: R2

YEAR	MO	FLOW
1955	3	469.
1956	3	701.
1957	12	523.
1958	3	152.
1959	4	424.
1960	4	760.
1961	2	229.
1962	3	265.
1963	3	716.
1964	3	726.
1965	3	725.
1966	12	603.
1967	4	488.
1968	2	838.
1969	2	566.
1970	4	294.
1971	4	348.
1972	4	360.
1973	3	513.
1974	3	524.
1975	4	464.
1976	3	606.
1977	3	960.
1978	3	547.
1979	4	698.
1980	3	508.
1981	2	586.
1982	4	690.

STATION:02GE005
AREA: 146.
NATURAL FLOW

YEAR	MO	FLOW
1966	12	22.
1967	4	48.
1968	2	66.
1969	1	41.
1970	4	18.
1971	3	21.
1972	4	36.
1973	3	29.
1974	2	31.
1975	2	41.
1976	3	36.
1977	3	39.
1978	3	37.
1979	4	69.
1980	3	39.
1981	2	26.
1982	3	44.

STATION:02GE006
AREA: 3760.
REGULATION: R2

YEAR	MO	FLOW
1972	4	380.
1973	3	464.
1974	3	530.
1975	4	481.
1976	3	534.
1977	3	940.
1978	4	510.
1979	4	595.
1980	3	478.
1981	2	557.
1982	4	669.

STATION:02GE007
AREA: 202.
NATURAL FLOW

YEAR	MO	FLOW
1978	3	76.
1979	4	114.
1980	3	41.
1981	8	99.
1982	3	186.

STATION:02GG002
AREA: 730.
NATURAL FLOW

YEAR	MO	FLOW
1949	12	118.
1950	4	146.
1951	1	95.
1952	1	112.
1953	5	127.
1954	2	218.
1955	3	86.
1956	3	163.
1957	12	117.
1958	2	43.
1959	12	68.
1960	3	163.

STATION:02GG002
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1961	4	66.
1962	3	89.
1963	3	110.
1964	4	35.
1965	3	158.
1966	12	120.
1967	4	114.
1968	2	237.
1969	4	73.
1970	4	128.
1971	2	89.
1972	4	134.
1973	1	129.
1974	3	104.
1975	4	99.
1976	2	129.
1977	3	187.
1978	3	86.
1979	4	238.
1980	3	90.
1981	10	96.
1982	3	158.

STATION:02GG004
AREA: 609.
NATURAL FLOW

YEAR	MO	FLOW
1965	2	104.
1966	12	143.
1967	12	108.
1968	2	225.
1969	2	49.
1970	4	93.
1971	3	49.
1972	4	69.
1973	1	120.
1974	3	88.
1975	2	71.
1976	2	128.
1977	3	60.
1978	3	103.
1979	4	166.
1980	3	53.
1981	2	111.
1982	3	141.

STATION:02GG005
AREA: 172.
NATURAL FLOW

YEAR	MO	FLOW
1967	10	21.
1968	2	99.
1969	1	37.
1970	4	28.
1971	3	32.
1972	4	24.
1973	1	33.
1974	3	31.
1975	3	37.
1976	3	39.
1977	3	42.
1978	4	32.
1979	4	58.
1980	3	28.
1981	2	28.
1982	3	39.

STATION:02GG006
AREA: 267.
NATURAL FLOW

YEAR	MO	FLOW
1967	12	112.
1968	2	160.
1969	1	35.
1970	4	104.
1971	2	37.
1972	12	91.
1973	1	91.
1974	5	82.
1975	4	79.
1976	2	131.
1977	3	61.
1978	3	76.
1979	4	226.
1980	3	44.
1981	2	83.
1982	3	127.

STATION:02GG007
AREA: 1240.
NATURAL FLOW

YEAR	MO	FLOW
1968	2	326.
1969	2	117.
1970	4	155.
1971	2	98.
1972	4	132.
1973	3	144.
1974	3	129.
1975	2	137.
1976	2	164.
1977	3	147.
1978	3	136.
1979	4	257.
1980	3	119.
1981	2	139.
1982	3	187.

STATION:02GH001
AREA: 14.20
NATURAL FLOW

YEAR	MO	FLOW
1972	3	3.
1973	6	9.
1974	3	8.
1975	8	12.
1976	2	19.
1977	3	19.
1978	3	33.
1979	4	15.
1980	7	14.
1981	10	23.
1982	3	37.
1983	7	15.

STATION:02GH002
AREA: 125.
NATURAL FLOW

YEAR	MO	FLOW
1972	4	27.
1973	3	32.
1974	3	45.
1975	1	48.
1976	2	59.
1977	9	94.
1978	3	102.
1979	4	57.
1980	7	50.
1981	10	76.
1982	3	60.
1983	5	51.

STATION:02GH003
AREA: 159.
NATURAL FLOW

YEAR	MO	FLOW
1977	4	62.
1978	3	70.
1979	12	27.
1980	6	20.
1981	10	35.
1982	3	62.
1983	5	43.

STATION:02HA003
AREA: 686000.
NATURAL FLOW

YEAR	MO	FLOW
1926	12	6591.
1927	12	7472.
1928	1	7303.
1929	5	8514.
1930	1	7605.
1931	4	5842.
1932	3	6850.
1933	5	5726.
1934	12	5192.
1935	10	5441.
1936	3	5742.
1937	7	6631.
1938	12	6696.
1939	6	6257.
1940	11	6729.
1941	1	6258.
1942	12	7245.
1943	10	6981.
1944	6	6701.
1945	10	7403.
1946	1	6919.
1947	6	7373.
1948	5	7317.
1949	1	6784.
1950	1	6954.
1951	12	7739.

STATION:02HA003
AREA: 686000.
REGULATION: R

YEAR	MO	FLOW
1955	11	8588.
1956	5	6905.
1957	11	7332.
1958	1	6290.
1959	1	6183.
1960	11	6667.
1961	4	6668.
1962	1	6187.
1963	1	6961.
1964	5	5567.
1965	11	5948.
1966	12	6338.
1967	12	6428.
1968	12	7581.
1969	6	7203.
1970	11	7419.
1971	1	7317.
1972	12	8131.
1973	3	8371.
1974	4	8360.

STATION:02HA006
AREA: 293.
NATURAL FLOW

YEAR	MO	FLOW
1957	4	74.
1958	3	25.
1959	1	109.
1960	4	143.
1961	2	79.
1962	3	93.
1963	3	74.
1964	3	61.
1965	2	85.
1966	2	45.
1967	12	36.
1968	2	139.
1969	1	80.
1970	4	40.
1971	2	90.
1972	3	39.
1973	12	77.
1974	3	74.
1975	2	55.
1976	3	93.
1977	9	64.
1978	3	88.
1979	3	123.
1980	3	60.
1981	2	56.
1982	3	81.

STATION:02HA007
AREA: 230.
REGULATION: R3

YEAR	MO	FLOW
1958	3	22.
1959	3	107.
1960	4	90.
1961	2	53.
1962	11	57.
1963	3	52.
1964	3	36.
1965	2	66.
1966	2	36.
1967	12	39.
1968	2	49.
1969	1	56.
1970	12	29.
1971	2	55.
1972	12	31.
1973	12	53.
1974	2	44.
1975	2	40.
1976	3	67.
1977	12	48.
1978	3	53.
1979	12	54.
1980	3	50.
1981	2	37.
1982	12	43.

STATION:02HA014
AREA: 60.90
NATURAL FLOW

YEAR	MO	FLOW
1978	3	31.
1979	12	28.
1980	3	28.
1981	9	37.
1982	3	46.

TABLE 11.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02HB0001
AREA: 205.
REGULATION: R2

YEAR	MO	FLOW
1925	3	63.
1926	4	36.
1927	3	43.
1928	3	23.
1929	4	55.
1930	4	19.
1931	4	9.
1932	4	22.
1933	4	26.
1934	4	22.
1935	3	25.
1936	3	26.
1937	4	14.
1938	3	15.
1939	4	24.
1940	4	19.
1941	4	15.
1942	3	44.
1943	4	22.
1944	4	22.
1945	3	13.
1946	3	30.
1947	4	30.
1948	3	38.
1949	3	21.
1950	4	65.
1951	3	33.
1952	4	17.
1953	3	14.
1954	3	39.
1955	3	21.
1956	4	48.
1957	2	26.
1958	3	4.
1959	4	21.
1960	5	18.
1961	3	19.
1962	3	17.
1963	3	19.
1964	4	7.
1965	4	25.
1966	2	10.
1967	4	18.
1968	3	17.
1969	4	19.
1970	4	9.
1971	4	15.
1972	4	29.
1973	3	16.
1974	3	27.
1975	4	35.
1976	3	31.
1977	3	22.
1978	4	18.
1979	4	23.
1980	3	29.
1981	2	12.
1982	4	33.

STATION:02HB0002
AREA: 829.
REGULATION: R1

YEAR	MO	FLOW
1946	3	201.
1947	6	171.
1948	3	429.
1949	3	95.
1950	4	300.
1951	3	146.
1952	4	118.
1953	2	64.
1954	10	616.
1955	4	184.
1956	4	175.
1957	2	136.
1958	3	32.
1959	4	141.
1960	5	274.
1961	4	70.
1962	11	278.
1963	3	115.
1964	3	157.
1965	2	146.
1966	2	179.
1967	4	114.
1968	3	87.
1969	4	102.
1970	4	70.
1971	4	73.
1972	4	139.
1973	3	153.
1974	5	501.
1975	2	255.
1976	3	193.
1977	3	204.
1978	4	129.
1979	12	128.
1980	3	149.
1981	2	101.
1982	6	160.

STATION:02HB0004
AREA: 199.
REGULATION: R2

YEAR	MO	FLOW
1957	1	72.
1958	3	21.
1959	4	63.
1960	3	63.
1961	4	33.
1962	11	85.
1963	3	47.
1964	3	25.
1965	4	45.
1966	3	45.
1967	4	71.
1968	2	95.
1969	8	104.
1970	4	36.
1971	4	53.
1972	4	49.
1973	3	68.
1974	5	162.
1975	2	68.
1976	3	72.
1977	3	59.
1978	4	59.
1979	12	82.
1980	4	75.
1981	2	39.
1982	12	59.

STATION:02HB0005
AREA: 95.60
REGULATION: R3

YEAR	MO	FLOW
1959	4	13.
1960	4	25.
1961	2	12.
1962	11	19.
1963	3	10.
1964	3	9.
1965	2	19.
1966	12	10.
1967	4	21.
1968	2	21.
1969	4	16.
1970	4	8.
1971	3	16.
1972	4	18.
1973	3	24.
1974	5	45.
1975	2	21.
1976	3	21.
1977	3	24.
1978	3	19.
1979	4	14.
1980	4	18.
1981	8	11.
1982	4	18.

STATION:02HB0008
AREA: 127.
REGULATION: R1

YEAR	MO	FLOW
1963	3	19.
1964	4	6.
1965	2	24.
1966	12	7.
1967	4	10.
1968	2	12.
1969	7	33.
1970	9	9.
1971	6	9.
1972	4	20.
1973	3	14.
1974	5	23.
1975	4	19.
1976	3	19.
1977	3	16.
1978	4	12.
1979	4	23.
1980	3	19.
1981	2	11.
1982	6	28.

STATION:02HB0010
AREA: 166.
REGULATION: R/R3

YEAR	MO	FLOW
1961	2	19.
1962	11	29.
1963	3	18.
1964	3	9.
1965	2	34.
1966	12	15.
1967	4	28.
1968	2	32.
1969	4	18.
1970	4	14.
(1971	4	20.)
1972	3	17.
1973	3	21.
1974	1	23.
1975	2	16.
1976	9	26.
1977	3	21.
1978	3	21.
1979	3	31.
1980	4	20.
1981	2	14.
1982	4	29.

STATION:02HB0011
AREA: 235.
REGULATION: R2

YEAR	MO	FLOW
1964	7	20.
1965	4	29.
1966	3	16.
1967	4	33.
1968	3	23.
1969	1	28.
1970	4	14.
1971	4	17.
1972	4	25.
1973	3	24.
1974	3	26.
1975	2	19.
1976	3	26.
1977	9	34.
1978	4	25.
1979	4	25.
1980	4	23.
1981	2	15.
1982	4	31.

STATION:02HB0012
AREA: 82.60
NATURAL FLOW

YEAR	MO	FLOW
1966	3	11.
1967	4	15.
1968	2	13.
1969	1	10.
1970	4	7.
1971	4	14.
1972	3	11.
1973	3	20.
1974	1	26.
1975	2	29.
1976	3	20.
1977	3	28.
1978	4	27.
1979	4	33.
1980	3	31.
1981	2	15.
1982	3	45.

STATION:02HB0013
AREA: 62.20
REGULATION: R3

YEAR	MO	FLOW
1968	3	7.
1969	7	7.
1970	4	4.
1971	4	3.
1972	4	18.
1973	4	6.
1974	4	7.
1975	4	9.
1976	3	8.
1977	3	7.
1978	4	5.
1979	4	6.
1980	3	8.
1981	2	4.
1982	3	8.

STATION:02HB0015
AREA: 63.50
REGULATION: R3

YEAR	MO	FLOW
1973	3	6.
1974	3	5.
1975	4	3.
1976	3	6.
1977	3	10.
1978	4	9.
1979	4	6.
1980	3	5.
1981	2	5.
1982	4	9.

STATION:02HB0016
AREA: 124.
REGULATION: R

YEAR	MO	FLOW
1978	4	13.
1979	4	13.
1980	3	11.
1981	2	7.
1982	4	16.

STATION:02HB201
AREA: 40.92
NATURAL FLOW

YEAR	MO	FLOW
1967	12	14.45
1968	2	21.36
1969	3	6.49
1970	4	2.86
1971	4	5.63
1972	4	7.56
1973	3	5.46
1974	5	21.44
1975	4	4.06

STATION:02HB203
AREA: 121.21
REGULATION: R

YEAR	MO	FLOW
1967	12	50.
1968	2	35.
1969	1	37.
1970	4	10.
1971	4	15.
1972	4	23.
1973	0	0.
1974	0	0.
1975	2	25.

STATION:02HB204
AREA: 30.04
NATURAL FLOW

YEAR	MO	FLOW
1967	4	21.
1968	2	30.
1969	3	9.
1970	4	7.
1971	3	26.
1972	4	12.
1973	3	14.
1974	5	23.
1975	2	15.
1976	3	27.
1977	3	19.

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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02HC002
AREA: 166.
NATURAL FLOW

YEAR	NO	FLOW
1946	3	101.
1947	6	165.
1948	3	208.
1949	3	236.
1950	3	220.
1951	1	143.
1952	3	146.
1953	3	130.
1954	10	252.
1955	4	107.
1956	5	204.
1957	2	146.
1958	3	22.
1959	4	48.
1960	4	51.
1961	2	63.

STATION:02HC003
AREA: 800.
REGULATION: R1

YEAR	NO	FLOW
1952	3	141.
1953	3	176.
1954	10	1449.
1955	3	235.
1956	5	150.
1957	3	150.
1958	2	22.
1959	4	109.
1960	5	138.
1961	3	54.
1962	11	125.
1963	3	88.
1964	3	105.
1965	2	261.
1966	3	75.
1967	4	110.
1968	2	98.
1969	4	108.
1970	4	42.
1971	4	97.
1972	4	179.
1973	3	130.
1974	3	193.
1975	2	190.
1976	3	169.
1977	10	81.
1978	4	123.
1979	12	145.
1980	3	168.
1981	2	115.
1982	4	130.

STATION:02HC004
AREA: 112.
NATURAL FLOW

YEAR	NO	FLOW
1955	3	70.
1956	3	62.
1957	1	89.
1958	2	31.
1959	11	66.
1960	3	58.
1961	3	16.
1962	3	13.
1963	3	28.
1964	7	28.

STATION:02HC005
AREA: 88.10
REGULATION: R1

YEAR	NO	FLOW
1951	4	99.
1952	3	68.
1953	3	35.
1954	10	90.
1955	3	47.
1956	3	36.
1957	1	33.
1958	2	6.
1959	3	20.
1960	5	32.
1961	2	7.
1962	11	15.
1963	8	11.
1964	8	13.
1965	2	58.
1966	11	22.
1967	4	24.
1968	2	20.
1969	4	25.
1970	7	21.
1971	4	21.
1972	4	14.
1973	3	24.
1974	5	38.
1975	2	20.
1976	7	17.
1977	7	23.
1978	10	15.
1979	12	18.
1980	3	47.
1981	9	25.
1982	3	23.

STATION:02HC006
AREA: 249.
REGULATION: R1

YEAR	NO	FLOW
1949	2	101.
1950	4	110.
1951	4	105.
1952	3	144.
1953	3	99.
1954	3	140.
1955	3	10.
1956	4	107.
1957	2	151.
1958	2	31.
1959	4	98.
1960	5	101.
1961	4	28.
1962	3	55.
1963	3	61.
1964	12	40.
1965	2	97.
1966	3	33.
1967	4	62.
1968	2	100.
1969	4	45.
1970	4	25.
1971	4	45.
1972	4	75.
1973	3	75.
1974	3	80.
1975	2	104.
1976	3	69.
1977	3	71.

STATION:02HC009
AREA: 197.
NATURAL FLOW

YEAR	NO	FLOW
1954	10	121.
1955	4	27.
1956	5	40.
1957	2	17.
1958	3	6.
1959	4	36.
1960	4	30.
1961	2	9.
1962	3	9.
1963	3	28.
1964	3	8.
1965	2	51.
1966	2	12.
1967	4	23.
1968	3	25.
1969	3	27.
1970	4	11.
1971	4	21.
1972	4	49.
1973	3	27.
1974	3	61.
1975	2	56.
1976	3	41.
1977	3	23.
1978	4	30.
1979	3	32.
1980	3	46.
1981	2	31.
1982	4	41.

STATION:02HC011
AREA: 495.
NATURAL FLOW

YEAR	NO	FLOW
1957	2	70.
1958	3	11.
1959	4	59.
1960	3	64.
1961	3	21.

STATION:02HC012
AREA: 169.
REGULATION: R1

YEAR	NO	FLOW
1957	2	38.
1958	4	4.
1959	4	21.
1960	5	16.
1961	3	19.
1962	3	19.
1963	3	22.
1964	4	9.
1965	2	85.
1966	6	9.
1967	6	11.
1968	3	39.
1969	4	16.
1970	4	10.
1971	4	9.
1972	4	23.
1973	3	12.
1974	3	35.
1975	4	39.
1976	3	29.
1977	3	22.
1978	4	14.
1979	3	22.
1980	3	55.
1981	2	40.

STATION:02HC013
AREA: 88.10
NATURAL FLOW

YEAR	NO	FLOW
1958	2	7.
1959	3	48.
1960	3	55.
1961	9	11.
1962	11	25.
1963	8	19.
1964	7	31.
1965	2	36.
1966	-	-.
1967	4	66.
1968	9	28.
1969	4	13.
1970	4	21.
1971	6	31.
1972	4	32.
1973	3	63.
1974	-	-.
1975	-	-.
1976	-	-.
1977	-	-.
1978	-	-.
1979	12	47.
1980	3	153.
1981	9	46.
1982	8	67.

STATION:02HC015
AREA: 223.
REGULATION: R

YEAR	NO	FLOW
1958	3	9.
1959	4	75.
1960	4	85.
1961	3	29.
1962	3	9.

STATION:02HC017
AREA: 63.20
NATURAL FLOW

YEAR	NO	FLOW
1967	12	23.
1968	2	25.
1969	4	41.
1970	4	10.
1971	4	20.
1972	4	37.
1973	3	28.
1974	5	53.
1975	2	43.
1976	3	29.
1977	3	23.
1978	4	45.
1979	3	31.
1980	4	32.
1981	2	19.
1982	3	30.

STATION:02HC018
AREA: 106.
NATURAL FLOW

YEAR	NO	FLOW
1966	12	28.
1967	12	16.
1968	3	35.
1969	4	21.
1970	3	12.
1971	7	23.
1972	4	26.
1973	3	30.
1974	4	28.
1975	2	38.
1976	3	31.
1977	3	33.
1978	4	32.
1979	3	20.
1980	3	56.
1981	2	37.
1982	3	33.

STATION:02HC019
AREA: 93.50
NATURAL FLOW

YEAR	NO	FLOW
1966	5	11.
1967	4	31.
1968	2	52.
1969	4	23.
1970	4	16.
1971	4	20.
1972	4	36.
1973	3	37.
1974	4	31.
1975	2	66.
1976	3	31.
1977	3	37.
1978	5	37.
1979	3	28.
1980	3	113.
1981	2	59.
1982	3	48.

STATION:02HC022
AREA: 186.
REGULATION: R3

YEAR	NO	FLOW
1965	2	46.
1966	3	20.
1967	12	33.
1968	2	53.
1969	4	37.
1970	4	18.
1971	4	40.
1972	4	48.
1973	3	40.
1974	3	45.
1975	2	61.
1976	3	32.
1977	3	46.
1978	4	46.
1979	12	46.
1980	3	72.
1981	2	45.
1982	4	45.

STATION:02HC023
AREA: 62.20
NATURAL FLOW

YEAR	NO	FLOW
1969	3	16.
1970	4	5.
1971	4	7.
1972	4	17.
1973	3	11.
1974	3	26.
1975	2	26.
1976	3	18.
1977	3	10.
1978	4	14.
1979	3	16.
1980	3	17.
1981	2	16.

STATION:02HC024
AREA: 316.
REGULATION: R2

YEAR	NO	FLOW
1972	4	68.
1973	3	93.
1974	5	174.
1975	2	135.
1976	8	149.
1977	9	150.
1978	9	105.
1979	12	154.
1980	3	149.
1981	5	129.
1982	9	159.

STATION:02HC025
AREA: 303.
NATURAL FLOW

YEAR	NO	FLOW
1963	3	34.
1964	12	19.
1965	2	116.
1966	1	14.
1967	4	30.
1968	3	32.
1969	3	33.
1970	4	15.
1971	4	22.
1972	4	43.
1973	3	30.
1974	3	65.
1975	4	46.
1976	3	48.
1977	3	31.
1978	4	35.
1979	3	29.
1980	3	49.
1981	2	44.
1982	3	53.

STATION:02HC026
AREA: 98.10
REGULATION: R1

YEAR	NO	FLOW
1964	7	14.
1965	2	40.
1966	3	13.
1967	3	16.
1968	3	18.
1969	4	18.
1970	4	8.
1971	4	41.
1972	4	78.
1973	3	55.
1974	3	24.
1975	2	34.
1976	3	29.
1977	12	16.
1978	4	26.
1979	3	41.
1980	3	40.
1981	2	22.
1982	3	59.

STATION:02HC027
AREA: 58.
NATURAL FLOW

YEAR	NO	FLOW
1973	6	33.
1974	8	40.
1975	4	39.
1976	6	55.
1977	7	69.
1978	9	50.
1979	7	50.
1980	7	71.
1981	8	53.
1982	9	89.

STATION:02HC028
AREA: 77.70
NATURAL FLOW

YEAR	NO	FLOW
1964	3	32.
1965	2	25.
1966	12	11.
1967	8	20.
1968	3	15.
1969	4	16.
1970	4	7.
1971	12	21.
1972	4	21.
1973	3	29.
1974	4	28.
1975	2	34.
1976	3	21.
1977	3	27.
1978	5	28.
1979	12	20.
1980	3	33.
1981	9	17.
1982	12	19.

STATION:02HC029
AREA: 130.
NATURAL FLOW

YEAR	NO	FLOW
1971	7	31.
1972	4	41.
1973	2	44.
1974	3	69.
1975	2	67.
1976	8	46.
1977	3	40.
1978	9	40.
1979	3	33.
1980	7	76.
1981	2	49.
1982	9	49.

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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02HC4/29
AREA: 130.
NATURAL FLOW

YEAR	MO	FLOW
1955	3	70.
1956	3	62.
1957	1	89.
1958	2	31.
1959	11	65.
1960	3	58.
1961	3	16.
1962	3	13.
1963	3	20.
1964	7	20.
1965	2	67.
1966	12	27.
1967	4	21.
1968	3	26.
1969	4	24.
1970	4	17.
1971	7	31.
1972	4	41.
1973	2	44.
1974	3	69.
1975	2	67.
1976	8	46.
1977	3	40.
1978	9	40.
1979	3	33.
1980	7	76.
1981	2	49.
1982	9	49.

STATION:02HC030
AREA: 204.
NATURAL FLOW

YEAR	MO	FLOW
1967	4	74.
1968	8	157.
1969	4	97.
1970	8	57.
1971	3	84.
1972	4	58.
1973	3	72.
1974	5	163.
1975	2	132.
1976	3	56.
1977	9	71.
1978	9	46.
1979	12	97.
1980	4	97.
1981	8	95.
1982	3	74.

STATION:02HC031
AREA: 148.
NATURAL FLOW

YEAR	MO	FLOW
1966	3	33.
1967	6	80.
1968	11	41.
1969	3	51.
1970	4	25.
1971	4	40.
1972	4	47.
1973	3	45.
1974	5	54.
1975	3	30.
1976	3	29.
1977	3	38.
1978	3	54.
1979	4	32.
1980	4	41.
1981	2	26.

STATION:02HC032
AREA: 94.80
NATURAL FLOW

YEAR	MO	FLOW
1966	3	4.
1967	4	12.
1968	3	12.
1969	3	10.
1970	4	7.
1971	4	9.
1972	4	20.
1973	3	10.
1974	3	18.
1975	2	21.
1976	3	16.
1977	3	12.
1978	4	15.
1979	3	14.
1980	3	16.
1981	2	14.
1982	3	24.

STATION:02HC033
AREA: 63.20
NATURAL FLOW

YEAR	MO	FLOW
1966	11	23.
1967	4	39.
1968	8	50.
1969	4	23.
1970	8	46.
1971	8	24.
1972	7	22.
1973	3	25.
1974	5	58.
1975	2	31.
1976	3	21.
1977	9	30.
1978	1	23.
1979	12	29.
1980	7	50.
1981	2	31.
1982	9	33.

STATION:02HC034
AREA: 194.
REGULATION: R3

YEAR	MO	FLOW
1966	3	29.
1967	6	69.
1968	11	43.
1969	3	38.
1970	4	23.
1971	4	45.
1972	4	58.
1973	3	55.
1974	5	72.
1975	2	58.
1976	3	43.
1977	3	41.
1978	4	56.
1979	3	54.
1980	3	50.
1981	2	54.

STATION:02HC035
AREA: 15.30
REGULATION: R

YEAR	MO	FLOW
1975	2	1.87
1976	7	2.35
1977	3	1.69
1978	5	2.46
1979	10	1.99
1980	3	3.26
1981	2	2.99
1982	3	3.69

STATION:02HC038
AREA: 52.
REGULATION: R

YEAR	MO	FLOW
1975	2	16.
1976	3	12.
1977	3	12.
1978	5	12.
1979	3	11.
1980	3	24.
1981	8	8.
1982	3	17.

STATION:02HC039
AREA: 38.30
REGULATION: R

YEAR	MO	FLOW
1975	2	9.
1976	3	10.
1977	3	9.
1978	5	9.
1979	3	9.
1980	3	11.
1981	2	9.
1982	3	13.

STATION:02HC041
AREA: 21.70
REGULATION: R

YEAR	MO	FLOW
1975	2	556.
1976	3	450.
1977	3	513.
1978	4	436.
1979	3	281.
1980	3	745.
1981	2	427.
1982	3	402.

STATION:02HC045
AREA: 25.90
NATURAL FLOW

YEAR	MO	FLOW
1975	2	14.80
1976	3	9.83
1977	3	11.60
1978	5	11.80
1979	3	9.64
1980	3	13.15
1981	8	8.14
1982	3	15.90

STATION:02HC046
AREA: 10.60
NATURAL FLOW

YEAR	MO	FLOW
1975	2	10.50
1976	3	5.64
1977	3	6.31
1978	5	5.49
1979	3	5.26
1980	3	7.71
1981	2	4.20
1982	3	6.09

STATION:02HD002
AREA: 262.
NATURAL FLOW

YEAR	MO	FLOW
1954	2	132.
1955	3	238.
1956	3	113.
1957	2	82.
1958	3	16.
1959	4	194.
1960	5	85.
1961	3	33.
1962	11	30.
1963	3	69.
1964	12	65.
1965	4	78.
1966	3	48.
1967	4	41.
1968	2	41.
1969	3	47.
1970	4	20.
1971	4	30.
1972	4	53.
1973	4	32.
1974	4	52.
1975	3	88.

STATION:02HB003
AREA: 67.30
REGULATION: R1

YEAR	MO	FLOW
1960	5	18.
1961	2	10.
1962	11	25.
1963	3	12.
1964	7	18.
1965	2	34.
1966	3	24.
1967	1	12.
1968	3	19.
1969	3	15.
1970	4	8.
1971	4	8.
1972	4	14.
1973	3	22.
1974	4	18.
1975	3	20.
1976	3	15.
1977	3	21.
1978	7	12.
1979	3	13.
1980	3	56.
1981	2	20.
1982	4	42.

STATION:02HD004
AREA: 42.70
REGULATION: R1

YEAR	MO	FLOW
1960	5	25.74
1961	2	21.19
1962	3	1.69
1963	3	3.42
1964	7	12.32
1965	4	60.51
1966	3	32.87
1967	3	8.69
1968	3	21.50
1969	3	23.40
1970	4	2.70
1971	4	5.21
1972	4	11.40
1973	3	10.90
1974	4	14.60
1975	3	14.10
1976	3	8.55
1977	3	14.
1978	4	6.71
1979	3	10.
1980	3	61.20
1981	2	13.63
1982	3	26.40

STATION:02HB006
AREA: 82.90
REGULATION: R2

YEAR	MO	FLOW
1960	5	82.
1961	4	20.
1962	3	12.
1963	3	16.
1964	7	10.
1965	4	29.
1966	2	49.
1967	4	17.
1968	2	25.
1969	1	46.
1970	3	31.
1971	4	35.
1972	4	33.
1973	3	15.
1974	3	19.
1975	2	23.
1976	3	22.
1977	3	34.
1978	4	19.
1979	3	22.
1980	3	139.
1981	2	30.
1982	3	40.

STATION:02HD007
AREA: 77.70
NATURAL FLOW

YEAR	MO	FLOW
1960	5	45.
1961	12	12.
1962	11	17.
1963	3	6.
1964	12	11.
1965	4	28.
1966	3	59.
1967	4	15.
1968	2	24.
1969	1	30.
1970	4	11.
1971	4	18.
1972	4	32.
1973	4	23.
1974	3	17.
1975	2	22.
1976	3	27.
1977	3	37.
1978	4	29.
1979	4	21.
1980	3	145.
1981	2	48.
1982	4	47.

STATION:02HB008
AREA: 95.80
NATURAL FLOW

YEAR	MO	FLOW
1960	5	73.
1961	2	48.
1962	3	19.
1963	3	22.
1964	8	16.
1965	4	53.
1966	3	65.
1967	3	29.
1968	2	35.
1969	8	35.
1970	4	11.
1971	6	83.
1972	4	38.
1973	2	33.
1974	3	79.
1975	2	83.
1976	3	30.
1977	3	33.
1978	4	26.
1979	11	4.
1980	3	145.
1981	2	26.
1982	3	45.

STATION:02HB009
AREA: 82.60
NATURAL FLOW

YEAR	MO	FLOW
1966	3	37.
1967	3	14.
1968	3	16.
1969	1	11.
1970	4	7.
1971	4	9.
1972	4	20.
1973	2	15.
1974	3	21.
1975	2	22.
1976	3	16.
1977	3	15.
1978	4	18.
1979	3	11.
1980	3	115.
1981	2	24.
1982	4	27.

STATION:02HD010
AREA: 64.80
NATURAL FLOW

YEAR	MO	FLOW
1966	3	20.
1967	4	12.
1968	2	16.
1969	3	16.
1970	3	14.
1971	4	8.
1972	4	12.
1973	3	17.
1974	7	23.
1975	3	30.
1976	3	19.
1977	3	16.
1978	4	8.
1979	3	16.
1980	3	75.
1981	2	18.
1982	4	23.

STATION:02HD012
AREA: 232.
NATURAL FLOW

YEAR	MO	FLOW
1977	3	63.
1978	11	46.
1979	3	46.
1980	3	231.
1981	2	66.
1982	3	70.
1983	2	49.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02ND211
AREA: 6.22
NATURAL FLOW

YEAR	NO	FLOW
1969	3	1.56
1970	4	.52
1971	6	1.52
1972	4	2.49
1973	3	1.80
1974	3	2.71
1975	2	5.09
1976	3	2.24
1977	3	1.84
1978	4	1.61

STATION:02ND212
AREA: 20.46
NATURAL FLOW

YEAR	NO	FLOW
1966	3	16.39
1967	3	12.86
1968	3	4.47
1969	3	6.12
1970	4	3.03
1971	6	7.06
1972	4	5.17

STATION:02ND213
AREA: 10.36
NATURAL FLOW

YEAR	NO	FLOW
1966	12	3.68
1967	3	4.14
1968	2	27.32
1969	1	9.54
1970	3	3.07
1971	2	3.63
1972	4	3.84

STATION:02ND214
AREA: 26.16
NATURAL FLOW

YEAR	NO	FLOW
1967	4	4.67
1968	2	16.89
1969	3	5.82
1970	2	3.78
1971	4	4.85
1972	4	10.39
1973	4	10.
1974	2	6.68
1975	2	16.26
1976	3	10.34
1977	2	20.29
1978	4	9.45

STATION:02ND221
AREA: 4.92
REGULATION:

YEAR	NO	FLOW
1968	3	.37
1969	3	1.52
1970	4	.71
1971	3	1.08
1972	4	3.02
1973	3	3.86
1974	1	3.98
1975	2	6.74
1976	3	2.99
1977	3	2.62

STATION:02ND222
AREA: 15.80
NATURAL FLOW

YEAR	NO	FLOW
1967	3	5.77
1968	2	5.51
1969	1	3.79
1970	4	2.01
1971	4	6.11
1972	4	9.95
1973	3	14.62
1974	3	12.65
1975	2	26.35
1976	3	6.70
1977	3	12.07

STATION:02ND223
AREA: 17.35
NATURAL FLOW

YEAR	NO	FLOW
1966	3	18.15
1967	3	4.02
1968	2	7.04
1969	1	4.56
1970	3	1.25
1971	4	5.14
1972	4	6.01
1973	3	5.79
1974	3	7.82
1975	2	14.19
1976	3	5.65
1977	3	6.66

STATION:02ND224
AREA: 13.99
NATURAL FLOW

YEAR	NO	FLOW
1968	2	9.99
1969	1	12.80
1970	3	3.34
1971	2	9.03
1972	3	13.69
1973	2	11.48
1974	1	25.68
1975	2	28.20
1976	3	11.64
1977	3	15.58

STATION:02ND231
AREA: 10.88
NATURAL FLOW

YEAR	NO	FLOW
1967	12	.36
1968	3	.63
1969	3	.93
1970	4	.44
1971	4	.30
1972	4	1.16
1973	3	1.12
1974	4	1.96
1975	2	2.71
1976	3	1.77
1977	3	1.84

STATION:02ND232
AREA: 27.20
NATURAL FLOW

YEAR	NO	FLOW
1966	3	8.63
1967	3	2.61
1968	3	2.64
1969	3	2.96
1970	4	1.77
1971	4	1.46
1972	4	4.31
1973	3	6.14
1974	3	6.56
1975	2	11.04
1976	3	5.63

STATION:02ND233
AREA: 20.98
NATURAL FLOW

YEAR	NO	FLOW
1968	2	10.03
1969	1	11.60
1970	3	1.71
1971	4	7.68
1972	4	9.06
1973	4	4.60
1974	3	8.41
1975	2	18.41
1976	3	5.67
1977	12	4.04

STATION:02ND234
AREA: 17.61
NATURAL FLOW

YEAR	NO	FLOW
1970	3	1.
1971	4	5.
1972	4	14.
1973	2	11.
1974	3	10.
1975	2	19.
1976	3	10.
1977	3	8.

STATION:02NE001
AREA: 19.40
NATURAL FLOW

YEAR	NO	FLOW
1970	3	2.63
1971	4	2.78
1972	3	2.40
1973	2	4.87
1974	1	3.82
1975	3	3.40
1976	3	4.79
1977	3	3.74
1978	4	5.92
1979	3	5.56
1980	3	6.44
1981	2	6.85
1982	3	1.60

STATION:02NK002
AREA: 114.
REGULATION: R1

YEAR	NO	FLOW
1970	3	23.
1971	4	28.
1972	4	28.
1973	3	21.
1974	1	25.
1975	3	21.
1976	3	20.
1977	3	39.
1978	4	37.
1979	3	24.
1980	3	62.
1981	2	44.
1982	3	36.

STATION:02NK003
AREA: 29.30
NATURAL FLOW

YEAR	NO	FLOW
1970	3	7.67
1971	4	6.97
1972	4	8.18
1973	3	4.96
1974	4	7.16
1975	3	5.66
1976	3	6.51
1977	3	9.03

STATION:02NF002
AREA: 1280.
REGULATION: R3

YEAR	NO	FLOW
1963	4	29.
1964	5	38.
1965	4	50.
1966	12	54.
1967	11	60.
1968	1	43.
1969	5	64.
1970	4	36.
1971	4	50.
1972	5	58.
1973	3	53.
1974	5	78.
1975	4	45.
1976	4	81.
1977	12	32.
1978	5	38.
1979	5	56.
1980	4	60.
1981	2	55.
1982	4	61.

STATION:02NF003
AREA: 1270.
REGULATION: R2

YEAR	NO	FLOW
1966	12	101.
1967	6	91.
1968	4	84.
1969	5	101.
1970	4	89.
1971	4	131.
1972	4	115.
1973	3	128.
1974	5	133.
1975	4	119.
1976	4	191.
1977	12	32.
1978	4	99.
1979	4	120.
1980	4	119.
1981	2	145.
1982	4	155.

STATION:02NF004
AREA: 21.82
NATURAL FLOW

YEAR	NO	FLOW
1976	4	8.69
1977	3	5.41
1978	4	2.15
1979	3	7.59
1980	7	6.41
1981	2	5.03
1982	4	6.90

STATION:02NH001
AREA: 241.
REGULATION: R3

YEAR	NO	FLOW
1968	4	14.
1969	5	24.
1970	4	18.
1971	4	24.
1972	6	26.
1973	4	28.
1974	5	27.
1975	4	27.
1976	4	50.
1977	3	13.
1978	4	19.
1979	4	25.
1980	3	19.
1981	2	41.
1982	4	28.

STATION:02NH002
AREA: 326.
REGULATION: R3

YEAR	NO	FLOW
1972	6	26.
1973	4	32.
1974	4	30.
1975	4	32.
1976	4	23.
1977	12	14.
1978	5	26.
1979	4	26.
1980	4	30.
1981	9	14.
1982	4	16.
1983	5	33.

STATION:02NJ001
AREA: 110.
NATURAL FLOW

YEAR	NO	FLOW
1963	4	21.
1964	4	17.
1965	4	23.
1966	12	18.
1967	3	37.
1968	3	39.
1969	4	50.
1970	4	11.
1971	4	16.
1972	4	18.
1973	3	20.
1974	7	16.
1975	4	14.
1976	3	18.
1977	3	16.
1978	4	14.
1979	3	13.
1980	3	27.
1981	2	24.
1982	4	17.

STATION:02NJ002
AREA: 7360.
REGULATION: R3

YEAR	NO	FLOW
1966	12	318.
1967	7	343.
1968	1	204.
1969	5	318.
1970	4	204.
1971	4	360.
1972	4	314.
1973	4	388.
1974	5	330.
1975	4	266.
1976	4	447.
1977	4	183.
1978	5	323.
1979	4	360.
1980	4	340.
1981	3	313.
1982	4	341.

STATION:02NJ003
AREA: 282.
REGULATION: R1

YEAR	NO	FLOW
1971	4	36.
1972	4	43.
1973	3	52.
1974	4	29.
1975	3	46.
1976	3	68.
1977	3	23.
1978	4	28.
1979	3	42.
1980	3	68.
1981	2	65.
1982	4	29.

STATION:02NK002
AREA: 9090.
REGULATION: R3

YEAR	NO	FLOW
1950	4	334.
1951	5	594.
1952	4	346.
1953	4	312.
1954	4	366.
1955	4	274.
1956	5	302.
1957	12	312.
1958	1	238.
1959	4	290.
1960	4	494.
1961	4	206.
1962	3	182.
1963	5	191.
1964	4	211.
1965	4	283.
1966	12	324.
1967	7	311.
1968	4	270.
1969	5	352.
1970	4	254.
1971	4	303.
1972	4	355.
1973	4	444.
1974	4	348.
1975	3	328.
1976	4	444.
1977	3	304.
1978	4	344.
1979	4	415.
1980	4	370.

STATION:02NK003
AREA: 1990.
REGULATION: R3

YEAR	NO	FLOW
1963	4	94.
1964	4	75.
1965	4	123.
1966	12	110.
1967	4	87.
1968	4	106.
1969	5	116.
1970	4	104.
1971	4	155.
1972	4	136.
1973	4	142.
1974	4	119.
1975	4	124.
1976	4	229.
1977	3	75.
1978	4	134.
1979	4	180.
1980	4	122.
1981	2	190.
1982	4	156.

STATION:02NK004
AREA: 12000.
REGULATION: R3

YEAR	NO	FLOW
1967	11	430.
1968	3	442.
1969	5	530.
1970	4	391.
1971	4	518.
1972	4	515.
1973	4	564.
1974	4	493.
1975	4	480.
1976	4	705.
1977	3	362.
1978	4	518.
1979	4	647.
1980	3	670.
1981	2	666.
1982	4	536.

STATION:02NK005
AREA: 456.
REGULATION: R3

YEAR	NO	FLOW
1969	4	37.
1970	4	36.
1971	4	47.
1972	5	43.
1973	4	43.
1974	4	40.
1975	4	42.
1976	4	69.
1977	4	20.
1978	4	45.
1979	4	49.
1980	4	41.
1981	3	44.
1982	4	43.

STATION:02NK006
AREA: 541.
REGULATION: R

YEAR	NO	FLOW
1974	4	47.
1975	4	54.
1976	4	80.
1977	3	54.
1978	4	54.
1979	3	65.
1980	3	67.
1981	2	89.
1982	4	51.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02HL001
AREA: 2620.
REGULATION: R3

YEAR	NO	FLOW
1916	4	239.
1917	3	300.
1918	4	244.
1919	5	171.
1920	3	205.
1921	3	181.
1922	4	232.
1923	4	155.
1924	4	143.
1925	3	184.
1926	4	253.
1927	3	239.
1928	4	315.
1929	3	236.
1930	4	158.
1931	4	74.
1932	4	239.
1933	4	219.
1934	4	225.
1935	3	149.
1936	3	353.
1937	1	193.
1938	3	276.
1939	4	283.
1940	4	239.
1941	4	126.
1942	3	187.
1943	4	220.
1944	4	115.
1945	3	186.
1946	3	160.
1947	4	295.
1948	3	315.
1949	4	190.

STATION:02HL001 (CONTINUED)
REGULATION: R3

YEAR	NO	FLOW
1950	4	271.
1951	4	243.
1952	4	295.
1953	3	144.
1954	4	198.
1955	4	205.
1956	4	199.
1957	12	114.
1958	4	140.
1959	4	249.
1960	4	286.
1961	5	83.
1962	4	188.
1963	4	214.
1964	4	93.
1965	4	221.
1966	12	163.
1967	4	167.
1968	3	154.
1969	5	193.
1970	4	129.
1971	4	250.
1972	4	266.
1973	3	253.
1974	4	215.
1975	4	220.
1976	4	343.
1977	3	206.
1978	4	214.
1979	3	233.
1980	3	312.
1981	2	366.
1982	4	199.

STATION:02HL003
AREA: 401.
REGULATION: R3

YEAR	NO	FLOW
1965	4	62.
1966	12	40.
1967	4	39.
1968	3	33.
1969	5	70.
1970	4	27.
1971	4	44.
1972	4	52.
1973	3	52.
1974	4	48.
1975	4	57.
1976	4	72.
1977	3	45.
1978	4	47.
1979	3	55.
1980	3	80.
1981	2	73.
1982	4	41.

STATION:02HL004
AREA: 712.
NATURAL FLOW

YEAR	NO	FLOW
1965	4	75.
1966	12	58.
1967	4	56.
1968	3	52.
1969	5	78.
1970	4	45.
1971	4	70.
1972	4	84.
1973	3	80.
1974	4	85.
1975	4	83.
1976	4	109.
1977	3	75.
1978	4	69.
1979	3	76.
1980	3	116.
1981	2	139.
1982	4	61.

STATION:02HL005
AREA: 308.
NATURAL FLOW

YEAR	NO	FLOW
1966	12	27.
1967	4	26.
1968	3	26.
1969	5	34.
1970	4	23.
1971	4	31.
1972	4	41.
1973	3	39.
1974	4	31.
1975	4	43.
1976	4	50.
1977	3	29.
1978	4	40.
1979	3	44.
1980	3	48.
1981	2	53.
1982	4	34.

STATION:02HL101
AREA: 1770.
REGULATION: R

YEAR	NO	FLOW
1970	4	112.
1971	4	295.
1972	4	277.
1973	3	309.
1974	4	244.
1975	4	294.
1976	4	439.

STATION:02HL102
AREA: 160.
NATURAL FLOW

YEAR	NO	FLOW
1969	5	16.
1970	4	16.
1971	4	31.
1972	4	31.
1973	3	26.
1974	4	29.
1975	4	29.

STATION:02HL103
AREA: 199.
NATURAL FLOW

YEAR	NO	FLOW
1969	3	16.
1970	4	13.
1971	4	35.
1972	4	24.
1973	3	21.
1974	4	29.
1975	3	42.
1976	3	29.

STATION:02HM001
AREA: 777.
REGULATION: R2

YEAR	NO	FLOW
1952	4	85.
1953	3	53.
1954	4	72.
1955	10	97.
1956	4	93.
1957	2	50.
1958	3	45.
1959	4	101.
1960	4	90.
1961	4	30.
1962	3	59.
1963	3	62.
1964	4	32.
1965	4	49.
1966	12	40.
1967	4	52.
1968	9	53.
1969	3	68.
1970	4	44.
1971	4	77.
1972	4	75.
1973	3	70.

STATION:02HM002
AREA: 189.
REGULATION: R3

YEAR	NO	FLOW
1957	4	9.
1958	4	9.
1959	4	21.
1960	4	19.
1961	4	9.
1962	4	12.
1963	4	10.
1964	4	8.
1965	4	14.
1966	12	12.
1967	4	9.
1968	4	7.
1969	5	15.
1970	4	8.
1971	4	15.
1972	4	19.
1973	3	11.
1974	4	13.
1975	4	10.
1976	4	14.
1977	3	10.
1978	2	8.
1979	4	11.
1980	3	13.
1981	2	12.
1982	4	10.

STATION:02HM003
AREA: 891.
REGULATION: R2

YEAR	NO	FLOW
1959	4	95.
1960	4	121.
1961	5	35.
1962	3	64.
1963	3	77.
1964	4	43.
1965	11	62.
1966	12	52.
1967	4	64.
1968	3	58.
1969	5	82.
1970	3	48.
1971	4	79.
1972	4	73.
1973	3	79.
1974	4	81.
1975	3	78.
1976	3	89.
1977	3	73.
1978	4	75.
1979	4	72.
1980	3	152.
1981	2	113.
1982	4	82.

STATION:02HM004
AREA: 112.
NATURAL FLOW

YEAR	NO	FLOW
1972	4	24.
1973	4	17.
1974	4	27.
1975	3	26.
1976	3	25.
1977	3	32.
1978	4	25.
1979	3	24.
1980	3	52.
1981	2	40.
1982	4	27.

STATION:02HM005
AREA: 155.
NATURAL FLOW

YEAR	NO	FLOW
1973	4	24.
1974	4	37.
1975	3	33.
1976	3	33.
1977	3	44.
1978	4	33.
1979	3	37.
1980	3	65.
1981	2	59.
1982	4	33.

STATION:02HM006
AREA: 150.
REGULATION: R3

YEAR	NO	FLOW
1971	4	16.
1972	4	28.
1973	4	13.
1974	4	16.
1975	3	19.
1976	3	20.
1977	3	20.
1978	4	18.
1979	3	17.
1980	3	26.
1981	2	31.
1982	4	18.
1983	12	11.

STATION:02HM007
AREA: 694.
REGULATION: R3

YEAR	NO	FLOW
1974	4	52.
1975	3	49.
1976	4	78.
1977	3	45.
1978	4	54.
1979	3	44.
1980	3	66.
1981	2	68.
1982	4	56.
1983	12	35.

STATION:02HM201
AREA: 20.98
NATURAL FLOW

YEAR	NO	FLOW
1969	3	7.96
1970	4	3.45
1971	4	4.31
1972	4	4.03
1973	2	3.93
1974	4	7.28
1975	3	8.13

STATION:02JC008
AREA: 1780.
NATURAL FLOW

YEAR	NO	FLOW
1973	5	126.
1974	4	227.
1975	5	159.
1976	4	268.
1977	4	211.
1978	5	160.
1979	4	226.
1980	4	162.
1981	4	214.
1982	5	151.

STATION:02JC009
AREA: 251.
NATURAL FLOW

YEAR	NO	FLOW
1968	4	16.
1969	5	18.
1970	5	19.
1971	5	18.
1972	5	15.
1973	5	14.
1974	5	19.
1975	5	17.
1976	4	30.
1977	4	24.
1978	5	17.

STATION:02JD004
AREA: 4120.
REGULATION: R3

YEAR	NO	FLOW
1938	5	285.
1939	5	254.
1940	5	193.
1941	4	267.
1942	4	199.
1943	5	177.
1944	5	183.
1945	5	301.
1946	5	153.
1947	5	265.
1948	4	155.
1949	5	212.
1950	5	249.
1951	4	278.
1952	4	197.
1953	5	183.
1954	4	219.
1955	4	170.
1956	5	238.
1957	4	240.

STATION:02JD00
AREA: 3420.
REGULATION: R3

YEAR	NO	FLOW
1937	5	190.
1938	5	279.
1939	10	229.
1940	5	155.
1941	4	254.
1942	4	164.
1943	5	153.
1944	5	152.
1945	5	240.
1946	5	152.
1947	5	267.
1948	5	147.
1949	5	188.
1950	5	218.
1951	4	268.
1952	4	167.
1953	5	164.
1954	4	192.
1955	4	140.
1956	5	212.
1957	4	226.

STATION:02JD006
AREA: 3420.
REGULATION: R3

YEAR	NO	FLOW
1924	4	128.
1925	6	110.
1926	5	123.
1927	4	184.
1928	5	334.
1929	5	183.
1930	5	191.
1931	5	127.
1932	4	122.
1933	4	195.
1934	5	302.
1935	5	154.
1936	5	248.
1937	5	170.
1938	5	235.
1939	5	212.
1940	5	143.
1941	4	216.
1942	4	162.
1943	5	147.
1944	5	157.

STATION:02JD006 (CONTINUED)
REGULATION: R3

YEAR	NO	FLOW
1945	5	236.
1946	5	134.
1947	5	240.
1948	4	141.
1949	5	184.
1950	5	201.
1951	4	238.
1952	4	145.
1953	4	166.
1954	4	176.
1955	4	145.
1956	5	205.
1957	3	29.

STATION:02JD008
AREA: 6480.
REGULATION: R3

YEAR	NO	FLOW
1931	5	254.
1932	4	259.
1933	4	352.
1934	5	559.
1935	5	242.
1936	5	555.
1937	5	275.
1938	5	409.
1939	5	406.
1940	5	263.
1941	4	434.
1942	4	277.
1943	5	237.
1944	5	233.
1945	6	586.
1946	5	201.
1947	6	554.
1948	4	184.
1949	5	311.
1950	5	328.
1951	4	413.

STATION:02JD008 (CONTINUED)
REGULATION: R3

YEAR	NO	FLOW
1952	4	321.
1953	4	275.
1954	10	318.
1955	4	244.
1956	5	349.
1957	7	495.
1958	4	128.
1959	5	268.
1960	5	880.
1961	6	206.
1962	5	471.
1963	5	227.
1964	5	372.
1965	5	241.
1966	4	307.
1967	5	551.
1968	4	203.
1969	4	237.
1970	5	249.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02JE009
AREA: 4300.
REGULATION: R3

YEAR	MO	FLOW
1969	4	354.
1970	5	210.
1971	5	188.
1972	5	251.
1973	5	213.
1974	5	323.
1975	5	245.
1976	4	405.
1977	4	396.
1978	5	254.
1979	4	522.
1980	5	249.
1981	4	248.
1982	5	217.

STATION:02JE010
AREA: 4600.
REGULATION: R3

YEAR	MO	FLOW
1972	5	383.
1973	5	319.
1974	5	485.
1975	5	328.
1976	4	396.
1977	4	435.
1978	5	353.
1979	5	589.
1980	5	349.
1981	4	327.
1982	4	332.

STATION:02JE011
AREA: 1370.
REGULATION: R3

YEAR	MO	FLOW
1947	6	121.
1948	11	37.
1949	6	83.
1950	6	46.
1951	10	76.
1952	9	63.
1953	4	76.
1954	10	91.
1955	3	83.
1956	1	65.
1957	7	120.
1958	3	72.
1959	2	55.
1960	5	155.
1961	3	63.
1962	3	64.
1963	3	34.
1964	3	66.
1965	9	100.
1966	12	98.
1967	6	126.
1968	9	47.
1969	8	74.
1970	7	54.
1971	9	75.
1972	3	77.
1973	6	71.
1974	3	60.
1975	3	67.
1976	5	76.
1977	12	36.
1978	1	51.
1979	5	105.
1980	1	41.
1981	3	46.
1982	3	48.

STATION:02JE012
AREA: 1780.
REGULATION: R3

YEAR	MO	FLOW
1946	5	78.
1947	5	156.
1948	4	89.
1949	5	110.
1950	5	153.
1951	4	195.
1952	4	90.
1953	5	105.
1954	5	145.
1955	4	97.
1956	5	140.
1957	4	187.
1958	5	40.
1959	5	104.
1960	5	294.
1961	7	76.
1962	5	198.
1963	5	115.
1964	5	163.
1965	5	94.
1966	5	172.
1967	5	320.
1968	6	83.
1969	4	103.
1970	5	99.
1971	5	162.
1972	5	151.
1973	5	110.
1974	5	161.
1975	5	157.
1976	4	202.
1977	4	177.
1978	5	129.
1979	5	262.
1980	4	124.
1981	4	95.
1982	5	95.

STATION:02JE003
AREA: 46100.
REGULATION: R3

YEAR	MO	FLOW
1912	6	1971.
1913	5	2184.
1914	5	1311.
1915	5	1124.
1916	5	2382.
1917	5	2311.
1918	10	1508.
1919	5	2521.
1920	5	1350.
1921	5	2232.
1922	5	2862.
1923	5	1545.
1924	6	1401.
1925	6	1492.
1926	5	1602.
1927	5	1442.
1928	5	2312.
1929	5	2031.
1930	7	2367.
1931	4	1001.
1932	10	2291.
1933	5	2453.
1934	5	2672.
1935	5	1141.
1936	5	2674.
1937	5	1742.
1938	5	2322.
1939	6	2266.
1940	5	2277.
1941	4	2236.
1942	4	1571.
1943	6	1512.
1944	5	1529.
1945	6	2793.
1946	5	1835.
1947	6	3542.
1948	4	1384.
1949	6	1770.
1950	5	1832.
1951	4	2283.

STATION:02JE012
AREA: 47600.
REGULATION: R3

YEAR	MO	FLOW
1953	4	2126.
1954	10	2035.
1955	11	1224.
1956	6	1785.
1957	7	2255.
1958	11	1102.
1959	5	1504.
1960	5	3653.
1961	5	1102.
1962	5	1834.
1963	4	941.
1964	5	1477.
1965	9	1911.
1966	12	2160.
1967	5	2566.
1968	4	1029.
1969	11	1404.
1970	6	1785.
1971	5	1274.
1972	5	1032.
1973	5	2048.
1974	5	2205.
1975	6	1280.
1976	4	1872.
1977	4	1707.
1978	5	1024.
1979	5	2766.
1980	5	1765.
1981	4	1997.
1982	5	984.

STATION:02JE014
AREA: 2060.
NATURAL FLOW

YEAR	MO	FLOW
1963	4	125.
1964	4	89.
1965	5	159.
1966	4	181.
1967	4	157.
1968	4	124.
1969	4	136.
1970	7	259.
1971	4	174.

STATION:02JE018
AREA: 62.90
NATURAL FLOW

YEAR	MO	FLOW
1973	5	4.
1974	4	7.
1975	4	7.
1976	3	6.
1977	4	3.
1978	4	4.
1979	4	14.
1980	4	8.
1981	4	7.
1982	4	6.

STATION:02JE019
AREA: 1140.
REGULATION: R3

YEAR	MO	FLOW
1972	5	115.
1973	6	97.
1974	4	81.
1975	5	73.
1976	4	95.
1977	4	61.
1978	4	61.
1979	4	84.
1980	4	92.
1981	4	87.
1982	4	76.

STATION:02JE020
AREA: 932.
REGULATION: R3

YEAR	MO	FLOW
1972	5	112.
1973	4	78.
1974	4	88.
1975	4	76.
1976	4	83.
1977	4	60.
1978	4	81.
1979	4	93.
1980	4	106.
1981	4	104.
1982	4	101.

STATION:02JE021
AREA: 749.
REGULATION: R3

YEAR	MO	FLOW
1947	5	73.
1948	6	19.
1949	6	42.
1950	5	19.
1951	5	71.
1952	5	34.
1953	4	45.
1954	10	72.
1955	11	47.
1956	5	45.
1957	7	89.
1958	11	36.
1959	3	36.
1960	5	79.
1961	7	20.
1962	3	34.
1963	6	28.
1964	6	36.
1965	9	62.
1966	6	37.
1967	6	52.
1968	3	21.
1969	9	29.
1970	6	112.
1971	6	27.
1972	5	36.
1973	5	42.
1974	3	43.
1975	4	30.
1976	5	41.
1977	4	38.
1978	2	30.
1979	5	69.
1980	5	50.
1981	4	44.

STATION:02KA002
AREA: 57500.
REGULATION: R3

YEAR	MO	FLOW
1951	4	3111.
1952	4	2430.
1953	3	2662.
1954	10	2450.
1955	4	1754.
1956	5	2013.
1957	6	2970.
1958	12	1092.
1959	5	1669.
1960	5	4141.
1961	5	1408.
1962	5	2458.
1963	5	1098.
1964	5	1769.
1965	10	1935.
1966	12	2466.
1967	5	2836.
1968	4	1709.
1969	5	1576.
1970	6	2120.
1971	5	1866.
1972	5	1925.
1973	5	2305.
1974	5	2499.
1975	5	1656.
1976	4	2087.
1977	4	2008.
1978	4	1584.
1979	5	4896.
1980	5	2088.
1981	4	2441.
1982	4	1673.

STATION:02KA003
AREA: 7.3
NATURAL FLOW

YEAR	MO	FLOW
1967	4	50.
1968	4	48.
1969	5	32.
1970	4	36.
1971	4	44.
1972	5	52.
1973	6	60.
1974	4	56.
1975	4	47.
1976	4	48.
1977	4	30.
1978	4	47.
1979	4	38.
1980	4	32.
1981	4	52.
1982	4	43.

STATION:02KA004
AREA: .97
NATURAL FLOW

YEAR	MO	FLOW
1973	6	.34
1974	5	.12
1975	4	.11
1976	4	.13
1977	3	.07
1978	4	.06
1979	4	.10
1980	7	.05
1981	3	.10
1982	4	.12

STATION:02KA005
AREA: 3.44
NATURAL FLOW

YEAR	MO	FLOW
1968	3	.30
1969	8	.37
1970	5	.42
1971	4	.32
1972	5	.38
1973	6	.47
1974	4	.40
1975	4	.35
1976	4	.41
1977	3	.23
1978	4	.37
1979	4	.27
1980	4	.24
1981	3	.41
1982	4	.29
1983	5	.48

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02KA006
AREA: .70
NATURAL FLOW

YEAR	MO	FLOW
1970	7	.09
1971	4	.07
1972	4	.09
1973	4	.12
1974	5	.10
1975	4	.08
1976	4	.07
1977	3	.05
1978	4	.07
1979	4	.06
1980	4	.05
1981	3	.14
1982	4	.09

STATION:02KA007
AREA: .21
NATURAL FLOW

YEAR	MO	FLOW
1973	6	.05
1974	4	.07
1975	4	.09
1976	4	.07
1977	3	.03
1978	4	.04
1979	4	.04
1980	4	.03
1981	2	.07
1982	4	.04

STATION:02KA008
AREA: .13
NATURAL FLOW

YEAR	MO	FLOW
1972	7	.03
1973	6	.04
1974	4	.03
1975	4	.06
1976	4	.04
1977	3	.02
1978	4	.02
1979	4	.03
1980	4	.02
1981	3	.03
1982	4	.04

STATION:02KB001
AREA: 4120.
REGULATION: R3

YEAR	MO	FLOW
1916	5	143.
1917	5	268.
1918	5	85.
1919	5	148.
1920	5	96.
1921	4	176.
1922	4	263.
1923	5	229.
1924	5	191.
1925	5	138.
1926	5	160.
1927	7	122.
1928	5	278.
1929	5	314.
1930	5	160.
1931	5	52.
1932	4	155.
1933	4	184.
1934	5	246.
1935	5	110.
1936	5	258.
1937	5	197.
1938	4	267.
1939	5	183.
1940	5	166.
1941	4	242.
1942	4	205.
1943	5	336.
1944	5	110.
1945	4	168.
1946	4	132.
1947	5	350.
1948	4	280.
1949	4	238.
1950	4	127.
1951	4	362.

STATION:02KB001
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1952	4	253.
1953	3	209.
1954	4	178.
1955	4	292.
1956	5	177.
1957	7	135.
1958	4	146.
1959	5	190.
1960	4	403.
1961	5	131.
1962	5	177.
1963	4	183.
1964	4	113.
1965	5	257.
1966	4	264.
1967	4	246.
1968	4	195.
1969	4	203.
1970	5	239.
1971	4	283.
1972	5	362.
1973	4	272.
1974	4	345.
1975	5	236.
1976	4	297.
1977	4	158.
1978	5	237.
1979	4	299.
1980	4	258.
1981	4	236.
1982	4	244.

STATION:02KC009
AREA: 2380.
REGULATION: R3

YEAR	MO	FLOW
1922	4	105.
1923	4	90.
1924	4	142.
1925	3	100.
1926	4	156.
1927	3	136.
1928	4	370.
1929	4	164.
1930	5	31.
1931	4	51.
1932	4	122.
1933	4	106.
1934	4	90.
1935	3	98.
1936	4	92.
1937	4	245.
1938	3	196.
1939	4	80.
1940	4	128.
1941	4	62.
1942	4	80.
1943	5	132.
1944	4	40.
1945	3	104.
1946	3	113.
1947	4	237.
1948	3	146.
1949	3	106.
1950	4	171.
1951	3	230.
1952	4	243.
1953	3	112.
1954	4	136.
1955	4	153.
1956	4	159.
1957	3	66.

STATION:02KC009
AREA: 2380.
REGULATION: R3

YEAR	MO	FLOW
1966	3	78.
1967	7	134.
1968	3	149.
1969	5	170.
1970	4	106.
1971	4	132.
1972	4	206.
1973	4	200.
1974	5	171.
1975	4	234.
1976	3	203.
1977	3	87.
1978	4	172.
1979	3	213.
1980	3	223.
1981	2	167.
1982	4	182.

STATION:02KC014
AREA: 443.
NATURAL FLOW

YEAR	MO	FLOW
1969	5	37.
1970	4	37.
1971	4	42.
1972	5	52.
1973	4	81.
1974	4	57.
1975	4	45.
1976	4	69.
1977	3	31.
1978	4	54.
1979	4	26.
1980	4	30.
1981	2	40.
1982	4	47.

STATION:02KC015
AREA: 660.
REGULATION: R3

YEAR	MO	FLOW
1969	4	57.
1970	4	36.
1971	4	61.
1972	4	53.
1973	4	52.
1974	4	37.
1975	4	36.
1976	4	52.
1977	4	27.
1978	4	52.

STATION:02KD001
AREA: 1370.
REGULATION: R3

YEAR	MO	FLOW
1916	4	103.
1917	4	87.
1918	4	65.
1919	5	92.
1920	4	55.
1921	3	169.
1922	4	189.
1923	4	141.
1924	5	97.
1925	4	64.
1926	5	99.
1927	3	64.
1928	4	210.
1929	5	138.
1930	5	50.
1931	5	28.
1932	4	81.
1933	4	103.
1934	5	94.
1935	5	42.
1936	5	138.
1937	4	74.
1938	3	127.
1939	4	110.
1940	5	75.
1941	4	111.
1942	4	85.

STATION:02KD002
AREA: 837.
REGULATION: R3

YEAR	MO	FLOW
1940	5	40.
1941	4	66.
1942	5	37.
1943	5	106.
1944	5	25.
1945	5	35.
1946	4	28.
1947	5	88.
1948	4	45.
1949	4	44.
1950	4	45.
1951	4	99.
1952	4	62.
1953	4	49.
1954	4	59.
1955	4	95.
1956	5	43.
1957	7	67.
1958	4	43.
1959	5	70.
1960	4	102.
1961	4	53.
1962	4	36.
1963	4	65.
1964	4	58.
1965	5	59.
1966	4	49.
1967	4	56.
1968	4	70.
1969	4	76.
1970	4	75.
1971	4	78.
1972	5	92.
1973	4	82.
1974	5	81.
1975	4	80.
1976	4	101.
1977	4	53.
1978	4	86.
1979	4	80.
1980	4	86.
1981	2	86.
1982	4	85.

STATION:02KD004
AREA: 5800.
REGULATION: R3

YEAR	MO	FLOW
1930	4	187.
1931	5	72.
1932	5	218.
1933	5	216.
1934	4	249.
1935	5	128.
1936	5	403.
1937	5	253.
1938	4	284.
1939	5	315.
1940	6	264.
1941	4	274.
1942	5	180.
1943	5	498.
1944	1	134.
1945	4	146.
1946	4	139.
1947	5	395.
1948	5	187.
1949	5	173.
1950	4	146.
1951	4	409.
1952	4	191.
1953	4	145.
1954	4	184.
1955	4	245.
1956	6	142.
1957	12	135.
1958	4	157.
1959	5	250.
1960	5	326.
1961	5	111.
1962	4	98.
1963	4	138.
1964	4	131.
1965	5	211.
1966	12	209.
1967	10	264.
1968	1	153.
1969	5	320.
1970	5	195.
1971	4	317.
1972	5	350.

STATION:02KD004
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1973	4	340.
1974	5	374.
1975	4	272.
1976	4	371.
1977	12	131.
1978	4	286.
1979	4	264.
1980	4	256.
1981	3	320.
1982	5	295.

STATION:02KD006
AREA: 1010.
REGULATION: R3

YEAR	MO	FLOW
1942	4	61.
1943	5	148.
1944	5	35.
1945	3	64.
1946	4	34.
1947	5	191.
1948	4	64.
1949	4	71.
1950	4	55.
1951	4	154.
1952	4	157.
1953	4	80.
1954	4	99.
1955	4	125.
1956	5	55.
1957	2	13.

STATION:02KD007
AREA: 2720.
REGULATION: R3

YEAR	MO	FLOW
1943	5	229.
1944	1	137.
1945	6	84.
1946	3	93.
1947	5	206.
1948	5	126.
1949	2	104.
1950	2	107.
1951	4	206.
1952	3	80.
1953	9	141.
1954	10	108.
1955	2	96.
1956	11	90.
1957	12	78.
1958	3	98.
1959	1	76.
1960	4	127.
1961	7	68.
1962	2	60.
1963	2	69.
1964	2	81.
1965	5	101.
1966	2	130.
1967	3	142.
1968	1	116.
1969	5	153.
1970	7	114.
1971	1	95.
1972	5	160.
1973	4	127.
1974	5	167.
1975	1	90.
1976	4	108.
1977	12	91.
1978	5	136.
1979	5	121.
1980	7	97.
1981	3	165.
1982	6	107.

STATION:02KE002
AREA: 8260.
REGULATION: R3

YEAR	MO	FLOW
1924	4	361.
1925	4	336.
1926	5	391.
1927	3	240.
1928	4	611.
1929	4	570.
1930	4	274.
1931	4	146.
1932	4	362.
1933	4	447.
1934	4	416.
1935	4	244.
1936	5	430.
1937	5	362.
1938	4	419.
1939	5	430.
1940	5	365.
1941	4	343.
1942	4	309.
1943	5	629.
1944	5	207.
1945	3	306.
1946	4	238.
1947	5	476.
1948	5	269.
1949	4	245.
1950	4	311.

TABLE 11.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02KE003
AREA: 8880.
REGULATION: R3

YEAR	MO	FLOW
1938	4	441.
1939	5	515.
1940	6	381.
1941	4	373.
1942	4	326.
1943	5	640.
1944	5	143.
1945	4	277.
1946	4	194.
1947	4	598.
1948	5	255.
1949	4	260.
1950	4	306.
1951	4	883.

STATION:02KE005
AREA: 8160.
REGULATION: R3

YEAR	MO	FLOW
1949	4	289.
1950	4	300.
1951	4	545.
1952	4	366.
1953	3	332.
1954	4	404.
1955	4	452.
1956	5	303.
1957	12	213.
1958	4	321.
1959	4	313.
1960	4	610.
1961	5	180.
1962	4	163.
1963	4	273.
1964	4	184.
1965	5	254.
1966	12	260.
1967	7	368.
1968	4	222.
1969	5	548.
1970	5	306.
1971	5	459.
1972	5	460.
1973	4	456.
1974	5	461.
1975	4	465.
1976	4	463.
1977	3	371.
1978	4	473.
1979	4	460.

STATION:02KF006
AREA: 2900.
REGULATION: R3

YEAR	MO	FLOW
1919	5	185.
1920	3	91.
1921	3	126.
1922	4	154.
1923	6	76.
1924	4	128.
1925	4	105.
1926	4	214.
1927	3	149.
1928	4	263.
1929	4	183.
1930	4	76.
1931	4	83.
1932	4	164.
1933	4	178.
1934	4	176.
1935	3	74.
1936	4	221.
1937	5	129.
1938	3	166.
1939	5	184.
1940	4	152.
1941	4	107.
1942	4	122.
1943	5	189.
1944	4	89.
1945	5	188.
1946	3	105.
1947	4	218.
1948	4	140.
1949	4	139.
1950	4	151.
1951	4	187.
1952	4	158.
1953	4	118.
1954	4	166.
1955	4	167.
1956	4	135.

STATION:02KF006
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1957	4	49.
1958	4	97.
1959	4	135.
1960	4	228.
1961	4	67.
1962	4	78.
1963	4	113.
1964	4	71.
1965	4	107.
1966	3	74.
1967	4	97.
1968	4	157.
1969	5	166.
1970	4	169.
1971	4	218.
1972	4	195.
1973	3	191.
1974	4	154.
1975	4	101.
1976	4	238.
1977	3	121.
1978	4	182.
1979	4	153.
1980	3	158.
1981	3	204.
1982	4	154.

STATION:02KF007
AREA: 1040.
REGULATION: R3

YEAR	MO	FLOW
1920	8	24.
1921	4	47.
1922	4	108.
1923	5	41.
1924	5	79.
1925	4	45.
1926	5	59.
1927	12	36.
1928	4	90.
1929	4	76.
1930	5	28.
1931	9	18.
1932	4	51.
1933	4	70.
1934	5	44.
1935	4	21.
1936	4	69.
1937	5	57.
1938	4	41.
1939	5	35.
1940	6	62.
1941	3	24.
1942	4	39.
1943	5	94.
1944	5	19.
1945	5	38.
1946	4	24.
1947	5	50.
1948	5	53.
1949	5	34.
1950	5	45.
1951	4	86.
1952	4	54.
1953	5	31.
1954	5	33.
1955	4	50.
1956	5	49.
1957	2	20.

STATION:02KF010
AREA: 614.
REGULATION: R3

YEAR	MO	FLOW
1971	4	72.
1972	4	77.
1973	4	75.
1974	4	65.
1975	4	77.
1976	4	101.
1977	3	41.
1978	4	81.
1979	4	56.
1980	3	66.
1981	2	104.
1982	4	73.

STATION:02KF011
AREA: 269.
NATURAL FLOW

YEAR	MO	FLOW
1972	4	96.
1973	3	56.
1974	4	58.
1975	4	78.
1976	4	60.
1977	3	54.
1978	4	69.
1979	3	62.
1980	3	46.
1981	2	61.
1982	4	47.
1983	3	40.

STATION:02KF012
AREA: 203.
REGULATION: R3

YEAR	MO	FLOW
1972	4	30.
1973	3	28.
1974	4	22.
1975	4	33.
1976	4	41.
1977	3	18.
1978	4	31.
1979	4	19.
1980	3	40.
1981	2	38.
1982	4	29.

STATION:02KF013
AREA: 280.
REGULATION: R3

YEAR	MO	FLOW
1972	5	34.
1973	4	30.
1974	4	29.
1975	4	33.
1976	4	45.
1977	3	20.
1978	4	37.
1979	4	26.
1980	3	26.
1981	2	42.
1982	4	34.

STATION:02KF014
AREA: 277.
REGULATION: R

YEAR	MO	FLOW
1975	4	19.
1976	4	27.
1977	3	17.
1978	4	21.
1979	4	22.
1980	3	20.
1981	2	23.
1982	4	20.

STATION:02LA004
AREA: 3830.
REGULATION: R3

YEAR	MO	FLOW
1949	3	388.
1950	4	456.
1951	4	436.
1952	4	401.
1953	3	341.
1954	4	446.
1955	4	523.
1956	4	386.
1957	3	146.
1958	3	317.
1959	4	438.
1960	4	544.
1961	3	207.
1962	4	355.
1963	3	486.
1964	4	120.
1965	12	161.
1966	3	237.
1967	4	329.
1968	3	396.
1969	4	349.
1970	4	456.
1971	4	513.
1972	4	578.
1973	3	464.
1974	4	488.
1975	4	413.
1976	3	597.
1977	3	473.
1978	4	527.
1979	3	423.
1980	3	421.
1981	2	446.
1982	4	435.

STATION:02LA005
AREA: 1290.
REGULATION: R3

YEAR	MO	FLOW
1973	4	93.
1974	4	95.
1975	4	80.
1976	4	78.
1977	4	44.
1978	4	58.
1979	4	42.
1980	4	46.
1981	2	85.
1982	4	43.

STATION:02LA006
AREA: 409.
REGULATION: R1

YEAR	MO	FLOW
1970	4	72.
1971	4	78.
1972	4	82.
1973	3	55.
1974	4	59.
1975	4	48.
1976	3	74.
1977	3	80.
1978	4	67.
1979	3	50.
1980	3	57.
1981	2	60.
1982	4	74.

STATION:02LA007
AREA: 559.
NATURAL FLOW

YEAR	MO	FLOW
1970	4	125.
1971	4	116.
1972	4	138.
1973	3	124.
1974	3	86.
1975	4	123.
1976	4	140.
1977	3	123.
1978	4	148.
1979	3	122.
1980	3	114.
1981	2	111.
1982	4	84.
1983	3	55.

STATION:02LB005
AREA: 3810.
REGULATION: R1

YEAR	MO	FLOW
1916	4	713.
1917	4	836.
1918	4	1017.
1919	3	771.
1920	3	725.
1921	3	664.
1922	3	526.
1923	4	613.
1924	4	709.
1925	3	757.
1926	4	959.
1927	3	859.
1928	4	1059.
1929	3	883.
1930	4	541.
1931	3	255.
1932	4	759.
1933	4	606.
1934	4	1036.
1935	3	483.
1936	3	666.
1937	4	830.
1938	3	1233.
1939	4	877.
1940	4	710.
1941	4	594.
1942	3	681.
1943	4	588.

STATION:02LB005
(CONTINUED)
REGULATION: R1

YEAR	MO	FLOW
1946	5	166.
1947	4	1108.
1948	3	750.
1949	3	806.
1950	4	987.
1951	4	1269.
1952	4	938.
1953	3	482.
1954	4	965.
1955	4	1029.
1956	4	605.
1957	3	262.
1958	3	675.
1959	4	560.
1960	4	883.
1961	3	382.
1962	4	665.
1963	4	869.
1964	3	365.
1965	3	261.
1966	3	462.
1967	4	883.
1968	3	852.
1969	4	705.
1970	4	850.
1971	4	1020.
1972	4	946.
1973	3	890.
1974	4	712.
1975	4	864.
1976	3	1110.
1977	3	804.
1978	4	1100.
1979	3	827.
1980	3	619.
1981	2	760.
1982	4	960.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:02LB006
AREA: 433.
NATURAL FLOW

YEAR	MO	FLOW
1948	3	190.
1949	3	139.
1950	4	257.
1951	3	229.
1952	4	151.
1953	3	113.
1954	4	304.
1955	4	265.
1956	4	122.
1957	3	80.
1958	3	102.
1959	4	145.
1960	4	104.
1961	3	94.
1962	3	136.
1963	4	184.
1964	4	75.
1965	3	40.
1966	3	91.
1967	4	125.
1968	3	193.
1969	4	87.
1970	4	208.
1971	4	145.
1972	4	152.
1973	3	170.
1974	4	185.
1975	4	127.
1976	3	175.
1977	3	102.
1978	4	146.
1979	3	162.
1980	3	149.
1981	2	103.
1982	3	251.

STATION:02LB007
AREA: 246.
NATURAL FLOW

YEAR	MO	FLOW
1948	3	80.
1949	4	38.
1950	4	125.
1951	3	61.
1952	4	43.
1953	3	45.
1954	4	61.
1955	4	61.
1956	4	78.
1957	3	23.
1958	3	50.
1959	4	66.
1960	4	107.
1961	3	21.
1962	3	60.
1963	3	70.
1964	3	19.
1965	3	18.
1966	3	28.
1967	4	30.
1968	3	39.
1969	3	38.
1970	4	62.
1971	4	61.
1972	4	58.
1973	3	58.
1974	4	77.
1975	4	43.
1976	3	52.
1977	3	82.
1978	4	48.
1979	3	31.
1980	3	54.
1981	2	49.
1982	3	69.

STATION:02LB008
AREA: 440.
NATURAL FLOW

YEAR	MO	FLOW
1949	3	114.
1950	4	150.
1951	3	150.
1952	4	124.
1953	3	92.
1954	-	-.
1955	4	154.
1956	4	119.
1957	3	45.
1958	3	75.
1959	4	143.
1960	4	111.
1961	3	77.
1962	4	77.
1963	4	133.
1964	4	44.
1965	4	37.
1966	3	70.
1967	4	141.
1968	3	103.
1969	4	78.
1970	-	-.
1971	-	-.
1972	-	-.
1973	-	-.
1974	-	-.
1975	-	-.
1976	4	261.
1977	3	172.
1978	4	247.
1979	3	318.
1980	3	135.
1981	2	282.
1982	4	172.

STATION:02LB009
AREA: 1050.
REGULATION: R1
NATURAL FLOW

YEAR	MO	FLOW
1955	4	201.
1956	4	210.
1957	3	65.
1958	3	180.
1959	4	323.
1960	4	255.
1961	3	108.
1962	3	289.
1963	4	274.
1964	3	112.
1965	3	119.
1966	3	149.
1967	4	159.
1968	3	199.
1969	3	144.
1970	4	223.
1971	4	302.
1972	4	221.
1973	3	239.
1974	4	220.
1975	4	123.
1976	3	255.
1977	3	272.
1978	4	236.
1979	3	127.
1980	3	163.
1981	2	214.
1982	4	289.

STATION:02LB012
AREA: 76.70
NATURAL FLOW

YEAR	MO	FLOW
1970	4	23.
1971	4	18.
1972	4	18.
1973	3	10.
1974	3	32.
1975	4	29.
1976	3	20.
1977	3	22.
1978	4	32.
1979	3	19.
1980	3	20.
1981	2	42.
1982	4	28.
1983	3	17.

STATION:02LB013
AREA: 2410.
REGULATION: R
NATURAL FLOW

YEAR	MO	FLOW
1976	3	1010.
1977	3	697.
1978	4	827.
1979	3	567.
1980	3	549.
1981	2	525.
1982	4	921.

STATION:02LB016
AREA: 76.10
NATURAL FLOW

YEAR	MO	FLOW
1978	4	40.
1979	3	47.
1980	3	64.
1981	2	43.
1982	4	86.
1983	4	12.

STATION:02LB017
AREA: 69.20
NATURAL FLOW

YEAR	MO	FLOW
1978	4	15.
1979	3	10.
1980	3	18.
1981	2	16.
1982	4	17.
1983	3	10.

STATION:02LB022
AREA: 152.
NATURAL FLOW

YEAR	MO	FLOW
1977	3	112.
1978	4	82.
1979	9	53.
1980	3	35.
1981	2	57.
1982	4	59.
1983	3	22.

STATION:02MA001
AREA: 0.
REGULATION: R

YEAR	MO	FLOW
1972	4	46.
1973	4	28.
1974	4	48.
1975	3	28.
1976	3	37.
1977	3	40.
1978	4	29.

STATION:02MB005
AREA: 772000.
REGULATION: R

YEAR	MO	FLOW
1861	7	8413.
1862	5	8812.
1863	6	8382.
1864	6	8414.
1865	6	8072.
1866	12	7662.
1867	6	8583.
1868	6	7421.
1869	7	8010.
1870	5	8892.
1871	6	7761.
1872	7	6772.
1873	6	7781.
1874	6	7961.
1875	7	7112.
1876	7	8554.
1877	7	7453.
1878	12	7709.
1879	5	7590.
1880	6	7390.
1881	7	7193.
1882	7	7993.

STATION:02MB005
(CONTINUED)
REGULATION: R4

YEAR	MO	FLOW
1883	7	8161.
1884	5	8383.
1885	7	7873.
1886	5	8552.
1887	6	8272.
1888	6	7250.
1889	7	7622.
1890	7	8276.
1891	4	7871.
1892	7	7312.
1893	6	7982.
1894	6	7532.
1895	5	6461.

STATION:02MB005
(CONTINUED)
REGULATION: R4

YEAR	MO	FLOW
1938	9	7102.
1939	6	6976.
1940	6	6802.
1941	14	6888.
1942	12	6981.
1943	6	8412.
1944	6	7502.
1945	5	8047.
1946	3	7672.
1947	7	8502.
1948	6	8163.
1949	5	7362.
1950	5	7851.
1951	6	8476.
1952	5	8928.
1953	6	8214.
1954	5	8184.
1955	5	8474.
1956	6	8162.
1957	6	7571.
1958	7	9180.

STATION:02MB006
AREA: 0.
REGULATION: R4

YEAR	MO	FLOW
1971	4	31.
1972	4	34.
1973	3	28.
1974	4	41.
1975	3	22.
1976	3	35.
1977	3	45.
1978	4	24.
1979	9	19.
1980	3	28.
1981	2	28.
1982	4	43.

STATION:02MC001
AREA: 404.
NATURAL FLOW

YEAR	MO	FLOW
1961	3	51.
1962	3	132.
1963	4	146.
1964	3	40.
1965	11	33.
1966	3	72.
1967	4	121.
1968	3	88.
1969	4	74.
1970	4	99.
1971	4	100.
1972	4	102.
1973	3	86.
1974	3	70.
1975	4	114.
1976	3	90.
1977	3	101.
1978	4	117.
1979	3	76.
1980	4	54.
1981	2	97.
1982	3	106.

STATION:02MC002
AREA: 774000.
REGULATION: R

YEAR	MO	FLOW
1968	12	7946.
1969	7	8471.
1970	12	7939.
1971	5	8130.
1972	9	8831.
1973	8	9946.
1974	8	9661.
1975	6	8784.
1976	6	9972.
1977	10	8640.
1978	4	9101.
1979	12	8640.
1980	1	8787.
1981	12	8780.

STATION:04CA002
AREA: 36500.
NATURAL FLOW

YEAR	MO	FLOW
1968	7	699.
1969	10	1197.
1970	7	778.
1971	5	690.
1972	5	722.
1973	5	640.
1974	6	697.
1975	6	691.
1976	5	379.
1977	10	282.
1978	11	474.
1979	6	715.
1980	5	414.
1981	6	499.
1982	6	887.

STATION:04CA003
AREA: 619.
NATURAL FLOW

YEAR	MO	FLOW
1968	6	31.
1969	9	56.
1970	5	25.
1971	4	36.
1972	5	50.
1973	5	38.
1974	6	48.
1975	8	32.
1976	5	19.
1977	4	24.
1978	5	29.
1979	5	32.
1980	4	29.

STATION:04CA004
AREA: 0.
NATURAL FLOW

YEAR	MO	FLOW
1968	7	84.
1969	10	146.
1970	1	58.
1971	5	69.
1972	5	82.
1973	5	67.
1974	6	72.
1975	6	99.
1976	5	50.
1977	10	34.
1978	9	56.
1979	5	102.
1980	5	37.
1981	6	55.
1982	6	82.

STATION:04CB001
AREA: 10800.
NATURAL FLOW

YEAR	MO	FLOW
1968	7	196.
1969	10	340.
1970	7	221.
1971	5	248.
1972	4	252.
1973	5	212.
1974	9	306.
1975	8	244.
1976	5	160.
1977	5	101.
1978	9	195.
1979	5	214.
1980	5	136.

STATION:04CC001
AREA: 94300.
NATURAL FLOW

YEAR	MO	FLOW
1970	6	2735.
1971	5	2223.
1972	5	2792.
1973	5	2620.
1974	6	2612.
1975	8	2440.
1976	6	1145.
1977	8	1300.
1978	8	1468.
1979	5	1873.

STATION:04CD001
AREA: 21100.
NATURAL FLOW

YEAR	MO	FLOW
1967	5	1172.
1968	9	543.
1969	10	348.
1970	5	796.
1971	5	605.
1972	5	1192.
1973	5	892.
1974	6	569.
1975	8	595.
1976	5	411.
1977	8	378.

STATION:04CD002
AREA: 4270.
NATURAL FLOW

YEAR	MO	FLOW
1973	6	111.
1974	6	90.
1975	6	110.
1976	6	49.
1977	8	41.
1978	11	51.
1979	6	61.
1980	10	46.
1981	6	66.
1982	6	89.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:04CE002
AREA: 4350.
NATURAL FLOW
YEAR NO FLOW
1968 10 61.
1969 10 59.
1970 7 90.
1971 5 74.
1972 6 58.
1973 9 70.
1974 6 85.
1975 8 104.
1976 7 60.
1977 8 33.
1978 8 52.
1979 6 39.
1980 10 48.
1981 10 64.
1982 9 86.

STATION:04DA001
AREA: 5960.
NATURAL FLOW
YEAR NO FLOW
1967 5 499.
1968 5 304.
1969 10 309.
1970 5 183.
1971 5 331.
1972 5 253.
1973 5 169.
1974 6 413.
1975 5 236.
1976 5 162.
1977 5 144.
1978 5 294.
1979 5 234.
1980 5 181.

STATION:04DA002
AREA: 19000.
NATURAL FLOW
YEAR NO FLOW
1968 7 486.
1969 10 716.
1970 10 476.
1971 5 694.
1972 6 456.
1973 6 515.
1974 6 835.
1975 6 447.
1976 6 391.
1977 6 261.

STATION:04DB001
AREA: 7950.
NATURAL FLOW
YEAR NO FLOW
1967 6 364.
1968 11 222.
1969 10 374.
1970 6 278.
1971 5 450.
1972 10 265.
1973 6 382.
1974 6 430.
1975 8 268.
1976 5 241.
1977 5 132.
1978 5 298.
1979 6 144.
1980 5 252.

STATION:04DB002
AREA: 3240.
NATURAL FLOW
YEAR NO FLOW
1968 10 94.
1969 10 187.
1970 7 130.
1971 5 200.
1972 5 123.
1973 6 95.
1974 6 214.
1975 8 120.
1976 5 118.
1977 5 68.

STATION:04DC001
AREA: 50000.
NATURAL FLOW
YEAR NO FLOW
1966 5 1710.
1967 6 1396.
1968 11 1538.
1969 10 1632.
1970 6 1441.
1971 5 2124.
1972 5 1532.
1973 5 2247.
1974 7 1600.
1975 8 1598.
1976 5 1444.
1977 5 689.
1978 6 957.
1979 5 1259.
1980 5 1012.
1981 5 2302.

STATION:04DC002
AREA: 4710.
NATURAL FLOW
YEAR NO FLOW
1968 5 214.
1969 5 250.
1970 5 291.
1971 5 390.
1972 5 263.
1973 5 530.
1974 6 243.
1975 5 253.
1976 5 357.
1977 4 136.
1978 5 208.
1979 4 399.
1980 5 384.
1981 5 410.
1982 5 384.

STATION:04EA001
AREA: 10400.
NATURAL FLOW
YEAR NO FLOW
1968 10 522.
1969 5 771.
1970 5 827.
1971 5 980.
1972 5 396.
1973 5 1140.
1974 6 580.
1975 8 603.
1976 5 1180.
1977 4 329.
1978 5 603.
1979 4 1085.
1980 5 999.
1981 5 1019.
1982 5 744.

STATION:04FA001
AREA: 9010.
REGULATION: R1
YEAR NO FLOW
1970 7 326.
1971 5 379.
1972 5 341.
1973 5 194.
1974 6 612.
1975 5 314.
1976 5 189.
1977 7 244.
1978 5 326.
1979 5 330.
1980 5 165.
1981 5 168.
1982 5 405.

STATION:04FA002
AREA: 1540.
REGULATION: R2
YEAR NO FLOW
1968 5 97.
1969 6 84.
1970 7 73.
1971 5 58.
1972 5 48.
1973 8 52.
1974 5 102.
1975 5 60.
1976 5 33.
1977 7 61.
1978 6 54.
1979 9 75.
1980 5 26.
1981 5 29.
1982 5 70.

STATION:04FA003
AREA: 4900.
NATURAL FLOW
YEAR NO FLOW
1967 5 335.
1968 10 187.
1969 7 311.
1970 9 215.
1971 5 254.
1972 5 231.
1973 5 251.
1974 5 345.
1975 5 214.
1976 6 165.
1977 4 162.
1978 5 283.
1979 9 250.
1980 5 173.
1981 6 243.
1982 5 288.

STATION:04FB001
AREA: 24200.
NATURAL FLOW
YEAR NO FLOW
1966 5 1260.
1967 6 1150.
1968 11 753.
1969 7 1120.
1970 10 736.
1971 5 1240.
1972 5 844.
1973 5 835.
1974 6 1440.
1975 5 827.
1976 6 343.
1977 9 453.
1978 5 807.
1979 5 847.
1980 5 541.
1981 5 695.
1982 5 1170.

STATION:04FC001
AREA: 35000.
NATURAL FLOW
YEAR NO FLOW
1969 5 2060.
1970 10 1296.
1971 5 3234.
1972 5 1190.
1973 5 1600.
1974 6 1983.
1975 8 1360.
1976 5 2591.
1977 4 1012.
1978 5 1429.
1979 5 1084.
1980 5 1102.
1981 5 1079.
1982 5 1606.

STATION:04GA002
AREA: 5370.
NATURAL FLOW
YEAR NO FLOW
1971 6 75.
1972 6 70.
1973 10 67.
1974 6 225.
1975 6 81.
1976 6 45.
1977 9 64.
1978 7 104.
1979 6 79.
1980 6 57.
1981 7 42.
1982 6 130.
1983 8 57.

STATION:04GA003
AREA: 2230.
REGULATION: R4
YEAR NO FLOW
1978 1 51.
1979 1 41.
1981 8 21.
1982 6 29.

STATION:04GB004
AREA: 11200.
NATURAL FLOW
YEAR NO FLOW
1972 5 200.
1973 5 208.
1974 5 614.
1975 5 238.
1976 5 182.
1977 9 176.
1978 6 317.
1979 5 209.
1980 5 156.
1981 7 124.
1982 5 197.
1983 7 274.

STATION:04GB005
AREA: 1170.
NATURAL FLOW
YEAR NO FLOW
1977 9 19.
1978 6 39.
1979 5 28.
1980 5 16.
1981 5 17.
1982 5 21.

STATION:04GC002
AREA: 16300.
REGULATION: R4
YEAR NO FLOW
1971 1 162.
1972 1 142.
1973 8 92.
1974 6 677.
1975 5 118.
1976 4 65.
1977 7 113.
1978 8 239.
1979 9 133.
1980 5 67.
1981 5 57.
1982 5 99.

STATION:04GD001
AREA: 32400.
REGULATION: R4
YEAR NO FLOW
1967 6 811.
1968 10 778.
1969 6 934.
1970 10 612.
1971 5 810.
1972 5 501.
1973 8 586.
1974 6 1350.
1975 6 667.
1976 4 515.
1977 5 408.
1978 8 592.
1979 5 504.

STATION:04HA001
AREA: 118000.
REGULATION: R3
YEAR NO FLOW
1967 4 4831.
1968 4 3790.
1969 5 6230.
1970 5 4730.
1971 5 5320.
1972 5 3600.
1973 5 3620.
1974 5 5989.
1975 5 4829.
1976 4 7396.
1977 4 5040.
1978 5 4250.
1979 5 3590.
1980 5 5290.
1981 5 3050.
1982 5 6040.

STATION:04JA002
AREA: 3780.
NATURAL FLOW
YEAR NO FLOW
1951 5 290.
1952 5 156.
1953 5 278.
1954 5 233.
1955 5 169.
1956 6 242.
1957 4 281.
1958 4 178.
1959 5 215.
1960 5 322.
1961 5 258.
1962 6 183.
1963 5 184.
1964 5 255.
1965 5 188.
1966 5 306.
1967 5 267.
1968 7 174.
1969 5 242.
1970 5 124.
1971 5 198.
1972 5 206.
1973 5 203.
1974 5 238.
1975 5 195.
1976 4 231.
1977 4 253.
1978 6 227.
1979 5 341.
1980 5 286.
1981 5 225.
1982 5 228.

STATION:04JC002
AREA: 2410.
NATURAL FLOW
YEAR NO FLOW
1951 5 169.
1952 4 102.
1953 5 167.
1954 5 171.
1955 5 73.
1956 5 100.
1957 5 104.
1958 4 120.
1959 5 91.
1960 5 170.
1961 5 152.
1962 6 110.
1963 5 96.
1964 5 142.
1965 5 105.
1966 5 199.
1967 5 168.
1968 4 107.
1969 5 135.
1970 5 68.
1971 5 98.
1972 5 106.
1973 5 101.
1974 5 138.
1975 5 91.
1976 5 107.
1977 5 135.
1978 5 119.
1979 5 166.
1980 5 137.
1981 5 83.
1982 5 113.

STATION:04JC003
AREA: 3290.
NATURAL FLOW
YEAR NO FLOW
1951 5 343.
1952 4 123.
1953 5 288.
1954 5 256.
1955 5 157.
1956 5 218.
1957 5 249.
1958 4 212.
1959 5 238.
1960 5 303.
1961 5 265.
1962 5 165.
1963 5 167.
1964 5 236.
1965 5 185.
1966 5 309.
1967 5 235.
1968 4 146.
1969 5 210.
1970 5 164.
1971 5 172.
1972 5 188.
1973 5 153.
1974 5 189.
1975 5 159.
1976 4 200.
1977 4 231.
1978 5 207.
1979 5 295.
1980 5 253.
1981 5 161.
1982 5 195.

STATION:04JD002
AREA: 4270.
REGULATION: R4
YEAR NO FLOW
1939 5 279.
1940 5 148.
1941 5 274.
1942 5 110.
1943 5 162.
1944 5 219.
1945 5 45.
1946 5 135.
1947 6 243.
1948 5 199.
1949 4 60.
1950 5 312.
1951 5 215.
1952 6 140.
1953 5 218.

STATION:04JD002
AREA: 4270.
REGULATION: R4
YEAR NO FLOW
1954 5 427.
1955 8 0.
1956 6 246.
1957 6 203.
1958 6 232.
1959 6 171.
1960 6 160.
1961 5 193.
1962 6 187.
1963 6 210.
1964 6 373.

STATION:04JD002
AREA: 4270.
REGULATION: R4
YEAR NO FLOW
1966 5 265.
1967 5 205.
1968 6 174.
1969 5 193.
1970 11 69.
1971 5 156.
1972 5 25.
1973 5 127.
1974 5 270.
1975 6 303.
1976 6 165.
1977 9 223.
1978 6 184.
1979 5 4.
1980 5 60.

STATION:04JD005
AREA: 2020.
NATURAL FLOW
YEAR NO FLOW
1968 4 130.
1969 5 176.
1970 5 195.
1971 5 143.
1972 5 195.
1973 4 189.
1974 5 185.
1975 5 197.
1976 4 260.
1977 4 202.
1978 5 178.
1979 5 186.
1980 5 234.
1981 5 113.
1982 5 224.

STATION:04JF001
AREA: 5360.
NATURAL FLOW
YEAR NO FLOW
1969 6 300.
1970 10 140.
1971 5 183.
1972 5 142.
1973 8 170.
1974 5 388.
1975 6 263.
1976 5 144.
1977 5 154.
1978 6 196.
1979 5 151.
1980 5 174.
1981 5 94.
1982 5 170.
1983 7 99.

STATION:04JG001
AREA: 26200.
REGULATION: R3
YEAR NO FLOW
1967 5 2520.
1968 4 1616.
1969 5 2120.
1970 5 1747.
1971 5 1500.
1972 5 1830.
1973 5 1480.
1974 5 2126.
1975 5 1670.
1976 4 2636.
1977 4 2550.
1978 5 1894.
1979 5 1812.
1980 5 2350.
1981 5 1120.
1982 5 2530.

STATION:04KA001
AREA: 4250.
NATURAL FLOW
YEAR NO FLOW
1973 4 246.
1974 5 538.
1975 5 264.
1976 4 476.
1977 4 821.
1978 5 443.
1979 4 304.
1980 4 509.
1981 5 89.
1982 5 766.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:04LA002
AREA: 5540.
REGULATION: R3

YEAR	MO	FLOW
1969	4	193.
1970	6	165.
1971	5	250.
1972	5	201.
1973	5	267.
1974	5	277.
1975	6	251.
1976	5	340.
1977	4	347.
1978	5	202.
1979	5	400.
1980	5	143.
1981	4	208.
1982	7	217.

STATION:04LB001
AREA: 10000.
REGULATION: R3

YEAR	MO	FLOW
1920	5	532.
1921	4	741.
1922	5	1085.
1923	5	494.
1924	4	301.
1925	6	475.
1926	7	476.
1927	4	672.
1928	5	1137.
1929	5	672.
1930	5	754.
1931	4	399.
1932	5	564.
1933	5	563.
1934	5	773.
1935	5	496.
1936	5	884.
1937	5	684.
1938	4	913.
1939	5	970.
1940	5	476.
1941	5	673.
1942	4	732.
1943	6	495.
1944	5	606.
1945	6	548.
1946	5	760.
1947	5	1126.
1948	4	560.
1949	5	645.
1950	5	882.
1951	4	698.
1952	4	615.
1953	5	570.
1954	4	615.
1955	4	551.
1956	5	799.
1957	4	925.
1958	10	304.
1959	5	562.
1960	5	1256.
1961	9	758.
1962	5	723.
1963	6	478.
1964	4	832.
1965	5	922.
1966	4	741.
1967	5	1038.
1968	4	635.
1969	4	599.
1970	5	543.
1971	5	489.
1972	5	596.
1973	4	600.
1974	5	579.
1975	6	440.
1976	4	1122.

STATION:04LC001
AREA: 3370.
REGULATION: R3

YEAR	MO	FLOW
1933	3	65.
1934	5	195.
1935	5	124.
1936	5	212.
1937	7	146.
1938	5	274.
1939	5	232.
1940	5	177.
1941	5	196.
1942	5	164.
1943	6	133.
1944	5	132.
1945	5	143.
1946	5	110.
1947	5	224.
1948	5	87.
1949	5	233.
1950	6	206.
1951	5	203.
1952	6	239.
1953	5	191.
1954	10	190.
1955	6	156.
1956	5	194.
1957	7	149.
1958	5	110.
1959	5	110.
1960	5	464.
1961	5	156.

STATION:04LD001
AREA: 11900.
REGULATION: R2

YEAR	MO	FLOW
1921	4	803.
1922	5	1711.
1923	5	649.
1924	4	443.
1925	4	591.
1926	5	644.
1927	4	1011.
1928	5	1366.
1929	5	765.
1930	5	1085.
1931	4	592.
1932	5	696.
1933	4	873.
1934	5	982.
1935	5	655.
1936	5	1388.
1937	5	1014.
1938	4	1271.
1939	5	1333.
1940	6	711.
1941	5	1143.
1942	4	1092.
1943	5	756.
1944	5	840.
1945	4	556.
1946	5	1088.
1947	5	1514.
1948	4	839.
1949	5	902.
1950	5	1367.
1951	5	935.
1952	4	767.
1953	5	1050.
1954	5	1016.
1955	4	683.
1956	5	993.
1957	4	1244.
1958	4	426.
1959	5	1050.
1960	5	1034.
1961	9	784.
1962	5	1081.
1963	6	709.
1964	4	1146.
1965	5	1077.
1966	5	716.
1967	5	1270.
1968	4	940.
1969	5	895.
1970	5	800.
1971	5	825.
1972	5	773.
1973	4	833.
1974	5	776.
1975	5	684.
1976	4	1449.
1977	4	1198.
1978	5	1170.
1979	5	1448.
1980	4	929.
1981	5	877.
1982	5	849.

STATION:04LF001
AREA: 6760.
REGULATION: R2

YEAR	MO	FLOW
1919	5	292.
1920	5	426.
1921	4	379.
1922	5	969.
1923	5	214.
1924	5	240.
1925	4	374.
1926	7	271.
1927	4	492.
1928	5	682.
1929	5	364.
1930	5	572.
1931	5	332.
1932	5	423.
1933	5	477.
1934	5	592.
1935	5	480.
1936	5	758.
1937	5	582.
1938	4	586.
1939	5	761.
1940	5	580.
1941	5	661.
1942	4	583.
1943	5	450.
1944	5	490.
1945	4	350.
1946	5	688.
1947	5	803.
1948	4	446.
1949	5	514.
1950	5	813.
1951	5	551.
1952	4	484.
1953	5	684.
1954	5	572.
1955	4	418.
1956	5	492.
1957	4	621.
1958	4	281.
1959	5	670.
1960	5	722.
1961	5	527.
1962	5	458.
1963	6	315.
1964	5	564.
1965	5	484.
1966	5	481.
1967	5	528.
1968	4	562.
1969	5	520.
1970	5	448.
1971	5	406.
1972	5	429.
1973	5	453.
1974	5	441.
1975	5	390.
1976	4	631.
1977	4	48[illegible].
1978	5	677.
1979	5	814.
1980	5	573.
1981	5	559.
1982	5	539.

STATION:04LG001
AREA: 34700.
REGULATION: R3

YEAR	MO	FLOW
1927	6	2906.
1928	5	4004.
1929	5	2219.
1930	5	2932.
1931	5	1606.
1932	5	1958.
1933	5	2184.
1934	5	2871.
1935	4	1833.
1936	5	3496.
1937	5	2867.
1938	4	3117.
1939	5	3897.
1940	5	1893.
1941	5	2741.
1942	4	2672.
1943	5	2067.
1944	5	2462.
1945	3	1595.
1946	5	2581.
1947	5	4309.
1948	4	2358.
1949	5	2487.
1950	5	3699.
1951	5	2526.
1952	4	2237.
1953	5	2755.
1954	5	2745.
1955	4	2032.
1956	5	2633.
1957	4	3586.
1958	4	1344.
1959	5	2919.
1960	5	3961.
1961	5	2271.
1962	5	2598.
1963	6	1651.

STATION:04LG01/3
AREA: 34700.
REGULATION: R3

YEAR	MO	FLOW
1927	4	2906.
1928	5	4004.
1929	5	2219.
1930	5	2932.
1931	5	1606.
1932	5	1958.
1933	5	2184.
1934	5	2871.
1935	4	1833.
1936	5	3496.
1937	5	2867.
1938	4	3117.
1939	5	3897.
1940	5	1893.
1941	5	2741.
1942	4	2672.
1943	5	2067.
1944	5	2462.
1945	3	1595.
1946	5	2581.
1947	5	4309.
1948	4	2358.
1949	5	2487.
1950	5	3699.
1951	5	2526.
1952	4	2237.
1953	5	2755.
1954	5	2745.
1955	4	2032.
1956	5	2633.
1957	4	3586.
1958	4	1344.
1959	5	2919.
1960	5	3961.
1961	5	2271.
1962	5	2598.
1963	6	1651.
1964	5	3554.
1965	5	2763.
1966	10	2364.
1967	5	3370.
1968	4	2662.
1969	5	2478.
1970	5	2455.
1971	5	2358.
1972	5	2341.
1973	4	2309.
1974	5	2184.
1975	5	2017.
1976	4	3743.
1977	4	2938.
1978	5	3444.
1979	5	5108.
1980	5	3890.
1981	5	2610.
1982	5	2883.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:04LG002
AREA: 61100.
REGULATION: R2

YEAR	MO	FLOW
1963	5	2940.
1964	5	6630.
1965	5	4980.
1966	4	5470.
1967	5	6000.
1968	4	5320.
1969	5	4790.
1970	5	4670.
1971	4	3880.
1972	5	4640.
1973	5	4330.
1974	5	4790.
1975	5	4580.
1976	4	7071.
1977	4	6090.
1978	5	6430.
1979	5	8330.
1980	5	6810.
1981	5	4870.
1982	5	6150.

STATION:04LG003
AREA: 34700.
REGULATION: R3

YEAR	MO	FLOW
1964	5	3554.
1965	5	2763.
1966	10	2364.
1967	5	3370.
1968	4	2662.
1969	5	2478.
1970	5	2455.
1971	5	2358.
1972	5	2341.
1973	4	2309.
1974	5	2184.
1975	5	2017.
1976	4	3743.
1977	4	2938.
1978	5	3444.
1979	5	5108.
1980	5	2890.
1981	5	2610.
1982	5	2883.

STATION:04LJ001
AREA: 1940.
NATURAL FLOW

YEAR	MO	FLOW
1920	5	604.
1921	4	545.
1922	5	1008.
1923	10	421.
1924	5	485.
1925	6	438.
1926	5	409.
1927	4	904.
1928	5	1326.
1929	5	499.
1930	5	1275.
1931	5	675.
1932	5	734.
1933	5	836.
1934	5	897.
1935	5	826.
1936	5	1207.
1937	5	1063.
1938	5	1061.
1939	5	1501.
1940	5	873.
1941	5	1150.
1942	4	915.
1943	5	929.
1944	5	1061.
1945	4	781.
1946	5	955.
1947	5	1398.
1948	4	918.
1949	5	945.
1950	5	1204.
1951	5	1078.
1952	4	882.
1953	5	1154.
1954	5	967.
1955	4	769.
1956	5	893.
1957	4	1330.
1958	4	596.
1959	5	1060.
1960	5	1200.
1961	5	923.
1962	5	799.

STATION:04LJ001
(CONTINUED)
NATURAL FLOW

YEAR	MO	FLOW
1963	6	606.
1964	5	983.
1965	5	711.
1966	5	951.
1967	5	728.
1968	4	915.
1969	5	770.
1970	5	779.
1971	5	626.
1972	5	838.
1973	5	801.
1974	5	702.
1975	5	756.
1976	4	1210.
1977	4	960.
1978	5	1040.
1979	5	1298.
1980	4	908.
1981	5	966.
1982	5	873.

STATION:04LM001
AREA: 22900.
NATURAL FLOW

YEAR	MO	FLOW
1973	4	1599.
1974	5	2020.
1975	4	1050.
1976	4	2421.
1977	4	2430.
1978	5	2176.
1979	5	2857.
1980	5	2410.
1981	5	1820.
1982	5	2650.

STATION:04MB003
AREA: 230.
REGULATION: R3

YEAR	MO	FLOW
1955	1	18.
1956	12	20.
1957	11	18.
1958	2	13.
1959	1	78.
1960	11	14.
1961	12	11.
1962	9	22.
1963	9	29.
1964	7	15.
1965	3	14.
1966	1	9.
1967	6	20.
1968	12	8.
1969	3	12.
1970	1	11.
1971	3	11.
1972	3	11.
1973	10	12.
1974	3	21.
1975	3	24.
1976	2	18.
1977	3	15.
1978	2	21.
1979	7	17.
1980	2	14.
1981	3	15.
1982	2	12.

STATION:04MC001
AREA: 13300.
REGULATION: R3

YEAR	MO	FLOW
1920	4	701.
1921	4	556.
1922	5	1014.
1923	4	421.
1924	4	366.
1925	6	933.
1926	7	1003.
1927	10	783.
1928	5	980.
1929	10	824.
1930	6	774.
1931	4	248.
1932	10	862.
1933	4	644.
1934	5	956.
1935	4	566.
1936	5	1165.
1937	4	478.
1938	4	846.
1939	7	893.
1940	5	946.
1941	5	783.
1942	4	655.
1943	6	767.
1944	5	658.
1945	6	1053.
1946	6	901.
1947	6	926.
1948	4	371.
1949	6	801.
1950	5	938.
1951	4	854.
1952	5	735.
1953	4	559.
1954	10	1129.
1955	4	872.
1956	5	701.
1957	6	1022.
1958	10	437.
1959	4	579.
1960	5	888.
1961	9	570.
1962	6	808.
1963	4	545.

STATION:04MC001
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1964	6	893.
1965	5	646.
1966	4	632.
1967	5	720.
1968	7	742.
1969	10	640.
1970	5	535.
1971	4	477.
1972	4	436.
1973	5	482.
1974	6	880.
1975	5	365.
1976	4	859.
1977	4	588.
1978	6	804.
1979	5	832.
1980	5	742.
1981	5	611.
1982	5	672.

STATION:04MC002
AREA: 9950.
REGULATION: R4

YEAR	MO	FLOW
1950	7	542.
1951	4	363.
1952	5	626.
1953	5	430.
1954	10	537.
1955	1	301.
1956	5	645.
1957	7	762.
1958	10	349.
1959	4	264.
1960	5	707.
1961	9	444.
1962	6	642.
1963	8	257.
1964	6	701.
1965	10	339.
1966	12	336.
1967	5	628.
1968	7	749.
1969	10	495.
1970	7	405.
1971	7	350.
1972	6	287.
1973	5	250.
1974	6	773.
1975	2	181.
1976	5	426.
1977	3	281.
1978	7	368.
1979	6	722.
1980	5	494.
1981	5	475.
1982	12	181.

STATION:04MD002
AREA: 2870.
REGULATION: R3

YEAR	MO	FLOW
1939	5	289.
1940	5	206.
1941	8	183.
1942	4	207.
1943	6	170.
1944	5	164.
1945	6	181.
1946	5	219.
1947	5	351.
1948	10	163.
1949	6	189.
1950	5	191.
1951	10	160.
1952	1	198.
1953	10	160.
1954	10	180.
1955	6	90.
1956	5	239.
1957	7	194.
1958	11	199.
1959	5	144.
1960	5	447.
1961	9	261.
1962	5	187.
1963	6	181.
1964	6	191.
1965	9	185.
1966	10	253.
1967	5	214.
1968	6	185.
1969	5	123.
1970	6	185.
1971	5	140.
1972	6	157.
1973	5	154.
1974	5	162.
1975	6	143.
1976	4	366.
1977	4	223.
1978	5	296.
1979	5	210.
1980	5	123.
1981	3	85.
1982	10	246.

STATION:04MD004
AREA: 401.
NATURAL FLOW

YEAR	MO	FLOW
1977	4	36.
1978	5	52.
1979	4	83.
1980	4	64.
1981	4	39.
1982	5	63.

STATION:04ME001
AREA: 20700.
REGULATION: R3

YEAR	MO	FLOW
1928	10	1850.
1929	10	1350.
1930	5	1203.
1931	11	822.
1932	10	1159.
1933	4	1257.
1934	5	1627.
1935	4	1017.
1936	5	1810.
1937	4	1547.
1938	4	1860.
1939	5	1693.
1940	5	1533.
1941	5	1207.
1942	4	1560.
1943	6	1268.
1944	5	1013.
1945	3	1208.
1946	5	1883.
1947	5	2017.
1948	4	1073.
1949	6	1024.
1950	5	1507.
1951	4	1437.
1952	5	1217.
1953	5	1045.
1954	4	1076.
1955	11	315.
1956	5	1543.
1957	4	1807.
1958	4	752.
1959	5	1072.
1960	5	1993.
1961	5	1395.
1962	5	1337.
1963	4	958.
1964	4	1423.
1965	5	1187.
1966	10	1552.
1967	5	1050.

STATION:04ME002
AREA: 22900.
REGULATION: R3

YEAR	MO	FLOW
1932	10	1233.
1933	4	1370.
1934	5	2313.
1935	4	1139.
1936	5	2330.
1937	4	1803.
1938	4	2210.
1939	5	2087.
1940	5	1900.
1941	5	1560.
1942	4	1773.
1943	6	1332.
1944	5	1295.
1945	3	1510.
1946	5	2290.
1947	5	2557.
1948	4	1578.
1949	6	1260.
1950	5	1627.
1951	4	1787.
1952	5	1563.
1953	5	1283.
1954	10	1747.
1955	4	1203.
1956	5	1653.
1957	4	2310.
1958	4	943.
1959	5	1220.
1960	5	2413.
1961	5	1274.
1962	5	1568.
1963	4	998.
1964	4	1757.
1965	5	1526.
1966	4	1327.
1967	5	2277.
1968	4	1260.
1969	5	1161.
1970	5	1277.
1971	5	1022.
1972	5	1254.
1973	4	965.
1974	5	972.
1975	5	1054.

STATION:04ME002
(CONTINUED)
REGULATION: R3

YEAR	MO	FLOW
1976	4	2133.
1977	4	1683.
1978	5	1277.
1979	5	2247.
1980	4	1560.
1981	5	1150.
1982	5	1457.

STATION:04ME003
AREA: 27500.
REGULATION: R3

YEAR	MO	FLOW
1960	5	2910.
1961	5	1650.
1962	6	1980.
1963	4	1370.
1964	4	2360.
1965	5	1770.
1966	10	1680.
1967	5	3428.
1968	5	1732.
1969	5	1337.
1970	5	1490.
1971	5	1980.
1972	5	1417.
1973	4	1250.
1974	5	1310.
1975	5	2021.
1976	4	2607.
1977	4	2940.
1978	5	2060.
1979	5	3400.
1980	4	1970.
1981	5	1570.
1982	5	1900.

STATION:04ME004
AREA: 9950.
REGULATION: R3

YEAR	MO	FLOW
1962	6	1770.
1963	4	1000.
1964	4	1850.
1965	5	1480.
1966	10	1803.
1967	5	2140.
1968	4	1730.
1969	5	1343.
1970	5	1550.
1971	5	1210.
1972	5	1307.
1973	4	1183.
1974	5	1139.
1975	5	1253.
1976	4	2530.
1977	4	1860.
1978	5	1593.
1979	5	3220.
1980	4	1943.
1981	5	1509.
1982	5	1840.
1983	5	1613.

STATION:04MF001
AREA: 6680.
NATURAL FLOW

YEAR	MO	FLOW
1967	5	1007.
1968	4	751.
1969	5	569.
1970	9	307.
1971	10	553.
1972	5	748.
1973	4	589.
1974	5	779.
1975	5	593.
1976	9	184.
1977	4	883.
1978	5	963.
1979	4	971.
1980	4	910.
1981	5	641.
1982	5	902.

TABLE II.0
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DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:05PA006
AREA: 13400.
NATURAL FLOW

YEAR	MO	FLOW
1923	6	91.
1924	11	136.
1925	7	135.
1926	7	111.
1927	5	476.
1928	10	223.
1929	5	135.
1930	7	102.
1931	7	165.
1932	6	240.
1933	6	134.
1934	5	440.
1935	5	286.
1936	5	340.
1937	6	326.
1938	5	524.
1939	6	247.
1940	7	222.
1941	10	334.
1942	6	286.
1943	7	406.
1944	6	402.
1945	5	365.
1946	11	286.
1947	7	345.
1948	5	422.
1949	7	224.
1950	6	800.
1951	5	416.
1952	5	224.
1953	6	345.
1954	5	555.
1955	5	158.
1956	6	365.
1957	5	311.
1958	7	63.
1959	6	154.
1960	6	256.
1961	5	294.
1962	6	311.
1963	6	187.
1964	7	345.
1965	6	422.
1966	5	444.
1967	5	345.
1968	6	566.
1969	5	433.
1970	6	464.
1971	5	362.
1972	5	365.
1973	10	239.
1974	6	382.
1975	5	314.
1976	5	362.
1977	9	450.
1978	6	357.
1979	5	433.
1980	10	153.
1981	5	369.
1982	5	352.

STATION:05PA012
AREA: 4510.
REGULATION: R2

YEAR	MO	FLOW
1930	7	112.
1931	6	93.
1932	5	100.
1933	5	72.
1934	5	195.
1935	5	116.
1936	5	189.
1937	5	145.
1938	5	225.
1939	5	117.
1940	6	114.
1941	5	134.
1942	5	133.
1943	6	161.
1944	6	209.
1945	4	173.
1946	10	175.
1947	5	179.
1948	5	265.
1949	7	103.
1950	5	442.
1951	5	195.
1952	5	108.
1953	6	134.
1954	5	289.
1955	5	77.
1956	5	105.
1957	5	189.
1958	9	37.
1959	6	66.
1960	5	139.
1961	5	114.
1962	6	127.
1963	6	52.
1964	7	131.
1965	5	174.
1966	5	220.
1967	5	130.
1968	6	256.
1969	5	226.
1970	6	282.
1971	5	206.
1972	5	205.
1973	10	133.
1974	6	175.
1975	5	156.
1976	4	224.
1977	10	158.
1978	6	151.
1979	5	206.
1980	9	110.
1981	5	194.
1982	5	182.

STATION:05PB009
AREA: 5080.
REGULATION: R3

YEAR	MO	FLOW
1964	7	196.
1965	5	164.
1966	5	208.
1967	4	84.
1968	6	183.
1969	6	138.
1970	6	226.
1971	11	147.
1972	7	99.
1973	8	77.
1974	6	181.
1975	6	61.
1976	4	78.
1977	9	164.
1978	6	132.
1979	5	118.
1980	10	69.
1981	6	100.
1982	7	119.

STATION:05PB014
AREA: 4870.
NATURAL FLOW

YEAR	MO	FLOW
1921	5	76.
1922	4	100.
1923	4	134.
1924	5	67.
1925	5	81.
1926	6	84.
1927	7	252.
1928	10	94.
1929	4	48.
1930	5	56.
1931	6	43.
1932	4	104.
1933	5	124.
1934	5	158.
1935	5	134.
1936	5	72.
1937	5	144.
1938	5	184.
1939	6	40.
1940	5	51.
1941	10	305.
1942	9	96.
1943	5	208.
1944	8	127.
1945	4	93.
1946	4	105.
1947	6	163.
1948	5	206.
1949	5	84.
1950	5	261.
1951	5	188.
1952	7	155.
1953	6	69.
1954	5	171.
1955	7	99.
1956	5	159.
1957	4	141.
1958	7	57.
1959	6	74.
1960	6	105.
1961	4	71.
1962	5	164.
1963	6	154.
1964	5	192.
1965	5	140.
1966	5	195.
1967	4	102.
1968	6	163.
1969	6	124.
1970	7	167.
1971	11	159.
1972	4	134.
1973	10	84.
1974	6	230.
1975	5	121.
1976	4	126.
1977	9	93.
1978	6	155.
1979	4	184.
1980	4	58.
1981	5	61.
1982	5	126.

STATION:05PC010
AREA: 168.
NATURAL FLOW

YEAR	MO	FLOW
1952	4	10.
1953	6	7.
1954	4	21.
1955	4	44.
1956	4	21.
1957	4	25.
1958	7	14.
1959	4	9.
1960	4	14.
1961	3	17.
1962	5	27.
1963	6	21.
1964	9	22.
1965	4	23.
1966	4	27.
1967	3	36.
1968	6	51.
1969	4	26.
1970	4	32.
1971	4	25.
1972	4	22.
1973	10	19.
1974	6	34.
1975	4	28.
1976	4	12.
1977	6	11.
1978	5	34.
1979	4	59.
1980	4	12.
1981	10	4.
1982	7	18.
1983	6	15.

STATION:05PC011
AREA: 461.
NATURAL FLOW

YEAR	MO	FLOW
1952	4	23.
1953	6	11.
1954	4	39.
1955	6	35.
1956	4	39.
1957	4	62.
1958	7	23.
1959	4	18.
1960	4	17.
1961	4	15.
1962	5	66.
1963	6	54.
1964	5	46.
1965	4	34.
1966	4	62.
1967	4	69.
1968	8	65.
1969	4	52.
1970	4	49.
1971	11	25.
1972	4	28.
1973	10	21.
1974	6	47.
1975	4	48.
1976	4	13.
1977	6	16.
1978	6	52.
1979	4	111.
1980	4	15.
1981	6	12.
1982	4	40.

STATION:05PC016
AREA: 243.
NATURAL FLOW

YEAR	MO	FLOW
1960	4	22.
1961	3	20.
1962	7	43.
1963	4	19.
1964	6	20.
1965	4	41.
1966	4	40.
1967	4	27.
1968	6	41.
1969	4	46.
1970	4	28.
1971	4	37.
1972	7	39.
1973	10	16.
1974	4	32.
1975	4	45.
1976	4	24.
1977	9	15.
1978	4	41.
1979	4	72.
1980	4	20.
1981	4	12.
1982	4	37.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:05PC018
AREA: 50200.
REGULATION: R3

YEAR	MO	FLOW
1929	5	476.
1930	5	558.
1931	6	345.
1932	11	454.
1933	4	985.
1934	7	758.
1935	7	868.
1936	4	663.
1937	4	1170.
1938	5	1850.
1939	4	506.
1940	5	869.
1941	10	1390.
1942	9	1033.
1943	6	1350.
1944	6	1362.
1945	3	1070.
1946	3	773.
1947	6	1530.
1948	4	1276.
1949	7	1008.
1950	5	2030.
1951	5	1390.
1952	7	861.
1953	7	923.
1954	4	1170.
1955	7	694.
1956	4	1010.
1957	6	1288.
1958	7	322.
1959	9	507.
1960	6	646.
1961	5	719.
1962	5	1560.
1963	6	835.
1964	6	1350.
1965	6	1070.
1966	4	1510.
1967	5	960.
1968	7	1316.
1969	4	1650.
1970	6	1610.
1971	11	1350.
1972	4	1035.
1973	10	821.
1974	6	1740.
1975	5	1490.
1976	4	753.
1977	9	1270.
1978	6	1210.
1979	4	1730.
1980	4	493.
1981	6	861.
1982	4	1090.

STATION:05PC019
AREA: 38600.
REGULATION: R3

YEAR	MO	FLOW
1923	3	250.
1924	6	149.
1925	7	245.
1926	11	515.
1927	6	1074.
1928	10	725.
1929	3	481.
1930	11	217.
1931	10	183.
1932	7	269.
1933	5	536.
1934	6	765.
1935	7	844.
1936	6	308.
1937	6	881.
1938	6	1044.
1939	9	339.
1940	8	297.
1941	10	1162.
1942	9	633.
1943	7	1073.
1944	8	1094.
1945	5	840.
1946	11	656.
1947	6	1037.
1948	5	890.
1949	7	860.
1950	7	1366.
1951	5	891.
1952	7	800.
1953	7	956.
1954	6	1146.
1955	7	796.
1956	6	805.
1957	7	1007.
1958	1	309.
1959	11	314.
1960	6	528.
1961	6	517.
1962	6	848.
1963	6	815.
1964	6	989.
1965	6	856.
1966	6	990.
1967	5	659.
1968	7	1042.
1969	6	901.
1970	6	952.
1971	11	919.
1972	7	698.
1973	10	624.
1974	6	998.
1975	7	566.
1976	5	409.
1977	10	924.
1978	7	869.
1979	6	831.
1980	1	307.
1981	6	675.
1982	6	696.

STATION:05PD022
AREA: .65
NATURAL FLOW

YEAR	MO	FLOW
1971	7	.19
1972	8	.28
1973	4	.14
1974	6	.31
1975	6	.12
1976	4	.10
1977	6	.07
1978	4	.10
1979	4	.12
1980	4	.06
1981	9	.12
1982	4	.20

STATION:05PD024
AREA: 1.70
NATURAL FLOW

YEAR	MO	FLOW
1975	6	.45
1976	4	.51
1977	4	.29
1978	4	.41
1979	4	.43
1980	4	.19
1981	9	.41
1982	4	.87

STATION:05PD025
AREA: .91
NATURAL FLOW

YEAR	MO	FLOW
1975	6	.14
1976	4	.11
1977	9	.09
1978	4	.19
1979	4	.24
1980	4	.06
1981	9	.22
1982	7	.19

STATION:05QA001
AREA: 13900.
NATURAL FLOW

YEAR	MO	FLOW
1922	5	201.
1923	5	173.
1924	6	111.
1925	7	245.
1926	10	264.
1927	6	587.
1928	9	226.
1929	7	150.
1930	7	89.
1931	7	132.
1932	5	332.
1933	6	220.
1934	6	477.
1935	6	273.
1936	5	243.
1937	6	310.
1938	6	253.
1939	7	129.
1940	7	86.
1941	10	615.
1942	1	160.
1943	7	403.
1944	6	272.
1945	5	196.
1946	5	369.
1947	6	309.
1948	5	264.
1949	5	217.
1950	6	652.
1951	6	398.
1952	7	337.
1953	7	368.
1954	6	719.
1955	6	244.
1956	6	446.
1957	5	249.
1958	10	169.
1959	6	335.
1960	6	231.
1961	6	223.
1962	9	234.
1963	7	253.
1964	5	366.
1965	6	250.
1966	6	485.
1967	6	272.
1968	7	450.
1969	6	377.
1970	6	382.
1971	11	432.
1972	1	227.
1973	10	150.
1974	6	547.
1975	5	200.
1976	5	201.
1977	7	125.
1978	6	309.
1979	5	273.
1980	5	117.
1981	7	152.
1982	5	112.

STATION:05QA002
AREA: 6230.
NATURAL FLOW

YEAR	MO	FLOW
1922	5	122.
1923	5	95.
1924	5	58.
1925	6	122.
1926	10	116.
1927	5	261.
1928	10	108.
1929	6	82.
1930	5	37.
1931	6	65.
1932	5	297.
1933	5	117.
1934	5	246.
1935	5	174.
1936	5	134.
1937	5	155.
1938	5	143.
1939	6	64.
1940	6	50.
1941	10	449.
1942	5	72.
1943	7	220.
1944	6	114.
1945	5	95.
1946	5	156.
1947	6	151.
1948	5	177.
1949	5	105.
1950	5	381.
1951	5	201.
1952	7	171.
1953	6	173.
1954	6	327.
1955	5	107.
1956	6	252.
1957	5	170.
1958	5	94.
1959	6	151.
1960	6	128.
1961	5	122.
1962	6	154.
1963	7	161.
1964	5	236.
1965	6	157.
1966	6	284.
1967	6	128.
1968	6	205.
1969	6	190.
1970	6	207.
1971	11	291.
1972	5	121.
1973	5	78.
1974	6	291.
1975	5	110.
1976	5	138.
1977	5	79.
1978	6	163.
1979	5	164.
1980	5	71.
1981	5	74.

STATION:05QA004
AREA: 4450.
NATURAL FLOW

YEAR	MO	FLOW
1962	6	81.
1963	6	71.
1964	9	173.
1965	6	75.
1966	5	226.
1967	6	103.
1968	6	185.
1969	6	143.
1970	6	116.
1971	11	161.
1972	5	77.
1973	7	58.
1974	5	210.
1975	5	96.
1976	4	96.
1977	9	47.
1978	6	143.
1979	5	101.
1980	5	56.
1981	7	69.
1982	5	79.

STATION:05QC001
AREA: 4920.
REGULATION: R3

YEAR	MO	FLOW
1963	6	106.
1964	5	100.
1965	6	78.
1966	5	132.
1967	5	106.
1968	6	109.
1969	7	93.
1970	11	104.
1971	5	72.
1972	4	107.
1973	6	91.
1974	6	205.
1975	6	88.
1976	4	65.
1977	9	100.
1978	6	82.
1979	5	96.
1980	4	58.
1981	6	38.
1982	6	100.

STATION:05QC003
AREA: 2370.
NATURAL FLOW

YEAR	MO	FLOW
1970	6	27.
1971	4	47.
1972	5	32.
1973	4	45.
1974	5	104.
1975	6	47.
1976	4	37.
1977	9	44.
1978	5	69.
1979	5	41.
1980	4	42.
1981	6	16.
1982	5	55.

DATA USED FOR SINGLE STATION FLOOD FREQUENCY ANALYSES

STATION:05QB002
AREA: 6450.
REGULATION: R3

YEAR	MO	FLOW
1928	6	105.
1929	6	55.
1930	5	73.
1931	7	43.
1932	4	117.
1933	4	143.
1934	5	188.
1935	5	195.
1936	5	125.
1937	4	203.
1938	5	244.
1939	7	74.
1940	5	56.
1941	9	325.
1942	9	85.
1943	6	203.
1944	6	133.
1945	4	133.
1946	3	239.
1947	6	209.
1948	4	175.
1949	4	93.
1950	5	235.
1951	5	162.
1952	7	122.
1953	6	115.

STATION:05QB003
AREA: 2510.
REGULATION: R3

YEAR	MO	FLOW
1971	11	86.
1972	1	50.
1973	10	19.
1974	6	97.
1975	6	38.
1976	4	25.
1977	6	20.
1978	9	19.
1979	7	20.
1980	4	26.
1981	7	19.
1982	7	57.

STATION:05QB006
AREA: 4370.
REGULATION: R3

YEAR	MO	FLOW
1954	5	236.
1955	4	136.
1956	5	215.
1957	5	105.
1958	7	68.
1959	7	88.
1960	4	132.
1961	4	185.
1962	8	155.
1963	6	202.
1964	10	182.
1965	6	171.
1966	5	224.
1967	4	104.
1968	6	130.
1969	8	157.
1970	5	211.
1971	4	176.
1972	4	105.
1973	4	79.
1974	6	276.
1975	4	144.
1976	4	141.
1977	6	102.
1978	4	150.
1979	4	151.
1980	4	89.
1981	7	110.
1982	7	174.

STATION:05QB016
AREA: 2300.
REGULATION: R3

YEAR	MO	FLOW
1971	11	93.
1972	6	27.
1973	10	28.
1974	5	121.
1975	5	43.
1976	1	14.
1977	6	34.
1978	6	63.
1979	5	97.
1980	12	14.
1981	1	13.
1982	7	86.

STATION:05QE005
AREA: 52300.
REGULATION: R3

YEAR	MO	FLOW
1959	7	1029.
1960	5	712.
1961	1	527.
1962	9	901.
1963	6	691.
1964	10	1122.
1965	5	853.
1966	6	937.
1967	12	522.
1968	11	854.
1969	10	806.
1970	11	919.
1971	4	925.
1972	4	738.
1973	10	663.
1974	6	1269.
1975	5	799.
1976	4	534.
1977	10	511.
1978	5	634.
1979	5	704.
1980	5	694.
1981	2	534.
1982	10	593.

STATION:05QE006
AREA: 26400.
NATURAL FLOW

YEAR	MO	FLOW
1907	9	342.
1908	1	280.
1909	6	209.
1910	5	386.
1911	8	260.
1912	10	392.
1913	1	246.
1914	6	252.
1915	7	237.
1916	7	542.
1917	9	200.
1918	7	231.
1919	10	210.
1920	7	271.
1921	6	300.
1922	7	214.
1923	9	266.
1924	6	181.
1925	7	419.
1926	11	340.
1927	7	612.
1928	9	301.

STATION:05QE006
AREA: 26400.
REGULATION: R4

YEAR	MO	FLOW
1929	1	171.
1930	7	235.
1931	11	193.
1932	5	271.
1933	7	256.
1934	7	468.
1935	9	347.
1936	1	306.
1937	7	327.
1938	11	246.
1939	1	239.
1940	1	195.
1941	11	709.
1942	1	450.
1943	6	655.
1944	6	577.
1945	7	318.
1946	5	449.
1947	7	415.
1948	9	433.
1949	1	287.
1950	7	745.
1951	1	304.
1952	8	455.
1953	12	285.
1954	6	1011.
1955	1	236.
1956	6	330.
1957	11	284.
1958	4	446.
1959	6	957.
1960	1	413.
1961	1	378.
1962	12	398.
1963	2	439.
1964	9	745.
1965	12	477.
1966	1	440.
1967	12	376.
1968	11	613.
1969	11	438.
1970	11	519.
1971	12	480.
1972	2	530.
1973	11	446.
1974	6	619.
1975	2	438.
1976	1	416.
1977	12	295.
1978	8	412.
1979	11	398.
1980	3	438.
1981	1	294.
1982	11	411.

STATION:05QE007
AREA: 37000.
REGULATION: R4

YEAR	MO	FLOW
1957	9	425.
1958	4	615.
1959	6	910.
1960	1	547.
1961	2	475.
1962	8	677.
1963	2	495.
1964	9	802.
1965	12	621.
1966	5	570.
1967	12	495.
1968	10	701.
1969	10	645.
1970	11	781.
1971	4	627.
1972	2	574.
1973	12	547.
1974	6	863.
1975	1	515.
1976	1	499.
1977	9	460.
1978	8	555.
1979	1	554.
1980	2	541.
1981	10	421.
1982	11	501.

STATION:05QE008
AREA: 1690.
NATURAL FLOW

YEAR	MO	FLOW
1970	6	47.
1971	6	27.
1972	4	14.
1973	4	17.
1974	6	71.
1975	6	27.
1976	4	15.
1977	9	13.
1978	6	33.
1979	6	22.
1980	4	13.
1981	7	7.
1982	7	20.

STATION:05QE009
AREA: 1530.
NATURAL FLOW

YEAR	MO	FLOW
1965	5	72.
1966	5	53.
1967	4	30.
1968	6	33.
1969	6	40.
1970	5	50.
1971	5	51.
1972	5	25.
1973	10	46.
1974	5	90.
1975	5	35.
1976	4	34.
1977	9	27.
1978	5	50.
1979	5	50.
1980	5	32.
1981	7	25.
1982	5	28.

TABLE II.1 LEGEND TO WATER SURVEY OF CANADA STATION NUMBERS FOR DATA USED IN STUDY

Sheet 1 of 3

02AA001 - PIGEON RIVER AT MIDDLE FALLS
02AA002 - PINE RIVER NEAR CROOKS
02AB001 - KAMINISTIQUIA RIVER NEAR DONA
02AB004 - KAMINISTIQUIA R. AT OUTLET OF DOG LAKE
02AB005 - SHEBANDOWAN RIVER AT GLENWATER
02AB006 - KAMINISTIKWIA RIVER AT KAMINISTIKWIA
02AB008 - NEEBING RIVER NEAR THUNDER BAY
02AB009 - SHEBANDOWAN RIVER AT SUNSHINE
02AB010 - KAMINISTIQUIA R. AT KAKABEKA FALLS P.H.
02AB012 - GREEN WATER C. AT OUT. OF GREEN WATER L.
02AB013 - KASHABOWIE R. AT OUTLET OF KASHABOWIE L.
02AB014 - NORTH CURRENT RIVER NEAR THUNDER BAY
02AB015 - CURRENT RIVER NEAR STEPSTONE
02AB016 - MCINTYRE RIVER AT THUNDER BAY
02AC001 - WOLF RIVER AT HIGHWAY NO.17
02AC002 - BLACK STURGEON RIVER AT HIGHWAY NO.17
02AD006 - NIPIGON RIVER BELOW VIRGIN FALLS
02AD008 - NIPIGON RIVER AT PINE PORTAGE
02AD010 - BLACKWATER RIVER AT BEARDMORE
02AE001 - GRAVEL RIVER NEAR CAVERS
02BA002 - STEEL RIVER NEAR TERRACE BAY
02BA003 - LITTLE PIC RIVER NEAR COLDWELL
02BB002 - BLACK RIVER NEAR MARATHON
02BB003 - PIC RIVER NEAR MARATHON
02BC002 - WHITE RIVER AT BERTRAND
02BC004 - WHITE RIVER BELOW WHITE LAKE
02BD001 - MAGPIE RIVER AT STEEP HILL FALLS
02BD002 - MICHIPICOTEN R. AT HIGH FALLS (1934-66)
02BD002 - MICHIPICOTEN R. AT HIGH FALLS (1950-82)
02BD003 - MAGPIE RIVER NEAR MICHIPICOTEN
02BE001 - MONTREAL R. AT ALGOMA CENTRAL AND HUDSON BAY RAILWAY
02BE002 - MONTREAL R. NEAR MONTREAL RIVER HARBOUR
02BF001 - BATCHAWANA RIVER NEAR BATCHAWANA
02BF002 - GOULAIS RIVER NEAR SEARCHMONT
02BF003 - BENNET CREEK AT SAULT STE. MARIE
02CA002 - ROOT RIVER AT SAULT STE. MARIE
02CB001 - MISSISSAGI RIVER BELOW AUBREY FALLS
02CB002 - MISSISSAGI RIVER AT ROCKY ISLAND LAKE
02CC004 - MISSISSAGI RIVER AT MISSISSAGI
02CC005 - LITTLE WHITE RIVER NEAR BELLINGHAM
02CC007 - MISSISSAGI RIVER AT RAYNER G.S.
02CC008 - MISSISSAGI RIVER AT MISSISSAGI CHUTE
02CC009 - MISSISSAGI RIVER AT RED ROCK FALLS
02CD001 - SERPENT RIVER AT HIGHWAY NO.17
02CD002 - SERPENT RIVER AT OUTLET OF DUNLOP LAKE
02CD003 - SERPENT RIVER BELOW QUIRKE LAKE
02CD004 - SERPENT RIVER BELOW PECORS LAKE
02CD005 - ROCHESTER CREEK ABOVE QUIRKE LAKE
02CD006 - SERPENT RIVER ABOVE QUIRKE LAKE
02CE001 - SPANISH RIVER AT ESPANOLA
02CE002 - AUX SABLES RIVER AT MASSEY
02CE004 - SPANISH RIVER AT HIGH FALLS
02CF004 - VERMILION R. AT LORNE FALLS (1918-53)
02CF004 - VERMILION R. AT LORNE FALLS (1954-82)
02CF005 - JUNCTION CREEK AT SUDBURY
02CF007 - WHITSON RIVER AT CHELMSFORD
02CF008 - WHITSON RIVER AT VAL CARON
02CF009 - NOLIN CREEK AT SUDBURY
02CF010 - ONAPING RIVER NEAR LEVACK
02CF011 - VERMILION RIVER NEAR VAL CARON
02CF012 - JUNCTION CREEK BELOW KELLEY LAKE
02DB003 - WANAPITEI RIVER NEAR CONISTON
02DB004 - CONISTON CREEK NEAR CONISTON
02DB005 - WANAPITEI RIVER NEAR WANUP
02DB006 - WANAPITEI RIVER NEAR STINSON
02DC003 - STURGEON RIVER AT CRYSTAL FALLS
02DC004 - STURGEON RIVER NEAR GLEN AFTON
02DC005 - TEMAGAMI RIVER NEAR RIVER VALLEY
02DC007 - TEMAGAMI RIVER AT CROSS LAKE DAM
02DC008 - TEMAGAMI RIVER AT RED CEDAR LAKE DAM
02DC009 - MARTEN RIVER AT WICKSTEED LAKE DAM
02DD001 - SOUTH RIVER NEAR POWASSAN
02DD002 - SOUTH RIVER ABOVE TROISLER CHUTE
02DD004 - FRENCH RIVER AT FRENCH RIVER
02DD005 - SOUTH RIVER NEAR NIPISSING
02DD007 - FRENCH RIVER AT LAKE NIPISSING
02DD008 - DUCHESNAY RIVER NEAR NORTH BAY
02DD009 - SOUTH RIVER AT SOUTH RIVER
02DD010 - FRENCH RIVER AT DRY PINE BAY
02DD012 - VEUVE RIVER NEAR VERNER
02DD013 - LA VASE RIVER AT NORTH BAY
02DD014 - CHIPPEWA CREEK AT NORTH BAY
02DD015 - COMMANDA CREEK NEAR COMMANDA
02EA005 - NORTH MAGNETAWAN R. NEAR BURK'S FALLS
02EA006 - MAGNETAWAN RIVER NEAR BURK'S FALLS
02EA008 - MAGNETAWAN RIVER AT MAPLE ISLAND
02EA010 - NORTH MAGNETAWAN R. ABOVE PICKEREL LAKE
02EA011 - MAGNETAWAN RIVER NEAR BRITT
02EA013 - HARRIS RIVER AT HIGHWAY NO.69
02EB002 - SOUTH BRANCH MUSKOKA R. AT BLACK BRIDGE
02EB003 - SOUTH BRANCH MUSKOKA RIVER AT MATHIAS
02EB004 - NORTH BRANCH MUSKOKA R. AT PORT SYDNEY
02EB005 - MUSKOKA RIVER NEAR BALA
02EB006 - MUSKOKA RIVER BELOW BALA
02EB007 - NORTH BR. MUSKOKA R. NEAR PORT SYDNEY
02EB008 - SOUTH BRANCH MUSKOKA R. AT BAYSVILLE
02EB011 - MOON RIVER AT HIGHWAY NO.69
02EB012 - MUSKOKA RIVER AT HIGHWAY NO.69
02EB013 - EAST RIVER NEAR HUNTSVILLE
02EC002 - BLACK RIVER NEAR WASHAGO
02EC003 - SEVERN RIVER AT SWIFT RAPID
02EC004 - SEVERN RIVER BELOW WASHAGO
02EC008 - BLACK RIVER AT BALDWIN
02EC009 - HOLLAND RIVER AT HOLLAND LANDING
02EC010 - SCHOMBERG RIVER NEAR SCHOMBERG
02EC011 - BEAVERTON RIVER NEAR BEAVERTON
02EC012 - BLACK RIVER AT SUTTON
02EC101 - UXBRIDGE BROOK AT UXBRIDGE
02EC103 - PEFFERLAW BROOK NEAR UDORA
02ED003 - NOTTAWASAGA RIVER NEAR BAXTER
02ED004 - BAILEY CREEK NEAR BEETON
02ED005 - MAD RIVER NEAR GLENCAIRN
02ED007 - COLDWATER RIVER AT COLDWATER
02ED009 - WILLOW CREEK ABOVE LITTLE LAKE
02ED010 - WILLOW CREEK AT MIDHURST
02ED011 - WYE RIVER AT WYEBRIDGE
02ED100 - BEETON CREEK NEAR TOTTENHAM
02ED101 - NOTTAWASAGA RIVER NEAR ALLISTON
02ED102 - BOYNE RIVER AT EARL ROWE PARK
02ED103 - PINE RIVER NEAR EVERETT
02FA001 - SAUBLE RIVER AT SAUBLE FALLS
02FA002 - STOKES RIVER NEAR FERNDALE
02FB001 - BEAVER RIVER ABOVE EUGENIA POWER HOUSE
02FB003 - BEAVER RIVER NEAR KIMBERLEY
02FB007 - SYDENHAM RIVER NEAR OWEN SOUND
02FB009 - BEAVER RIVER NEAR CLARKSBURG
02FB010 - BIGHEAD RIVER NEAR HEAFORD
02FC001 - SAUGEEN RIVER NEAR PORT ELGIN
02FC002 - SAUGEEN RIVER NEAR WALKERTON
02FC004 - ROCKY SAUGEEN RIVER NEAR TRAVERSTON
02FC011 - CARRICK CREEK NEAR CARLSRUHE
02FC012 - SOUTH SAUGEEN RIVER NEAR HANOVER
02FC013 - NORTH SAUGEEN RIVER NEAR PAISLEY
02FC014 - SAUGEEN RIVER NEAR DURHAM
02FC015 - TEESWATER RIVER NEAR PAISLEY
02FC016 - SAUGEEN RIVER ABOVE DURHAM
02FD001 - PINE RIVER AT LURGAN
02FE002 - MAITLAND RIVER BELOW WINGHAM
02FE003 - MIDDLE MAITLAND RIVER NEAR LISTOWEL
02FE004 - MAITLAND RIVER NEAR DONNYBROOK
02FE005 - MAITLAND RIVER ABOVE WINGHAM
02FE007 - LITTLE MAITLAND RIVER AT BLUEVALE
02FE008 - MIDDLE MAITLAND RIVER NEAR BELGRAVE
02FE009 - SOUTH MAITLAND RIVER AT SUMMERHILL
02FE010 - BOYLE DRAIN NEAR ATWOOD
02FF002 - AUSABLE RIVER NEAR SPRINGBANK
02FF003 - PARKHILL CREEK NEAR PARKHILL
02FF004 - SOUTH PARKHILL CREEK NEAR PARKHILL
02FF006 - SHIPKA CREEK NEAR GRAND BEND
02FF007 - BAYFIELD RIVER NEAR VARNA
02FF008 - PARKHILL CREEK ABOVE PARKHILL RESERVOIR
02GA001 - GRAND RIVER AT BELLWOOD
02GA002 - GRAND RIVER AT CONESTOGO
02GA003 - GRAND RIVER AT GALT (1914-42)
02GA003 - GRAND RIVER AT GALT (1914-79:43-79 WATR'LSD)
02GA003 - GRAND RIVER AT GALT (1943-79)
02GA003 - GRAND RIVER AT GALT (1943-82)
02GA008 - SPEED RIVER AT HESPELER
02GA010 - NITH RIVER NEAR CANNING
02GA013 - CONESTOGO RIVER NEAR CONESTOGO
02GA014 - GRAND RIVER NEAR MARSVILLE
02GA015 - SPEED RIVER BELOW GUELPH
02GA016 - GRAND RIVER BELOW SHAND DAM (1948-82)
02GA016 - GRAND RIVER BELOW SHAND DAM (1948-79)
02GA017 - CONESTOGO RIVER AT DRAYTON
02GA018 - NITH RIVER AT NEW HAMBURG
02GA022 - GRAND RIVER AT WALDEMAR
02GA023 - CANAGAGIGUE CREEK NEAR ELMIRA
02GA024 - LAUREL CREEK AT WATERLOO
02GA028 - CONESTOGO RIVER AT GLEN ALLAN
02GA029 - ERAMOSA RIVER ABOVE GUELPH
02GA030 - ALDER CREEK NEAR NEW DUNDEE
02GA031 - BLUE SPRINGS CREEK NEAR EDEN MILLS
02GA032 - O.A.C. FARM GAUGE NO. 5 AT GUELPH
02GA033 - LOTTERAL CREEK NEAR OOSTIC
02GA034 - GRAND RIVER AT WEST MONTROSE
02GA035 - EAST CANAGAGIGUE CREEK NEAR FLORADALE

TABLE II.1 LEGEND TO WATER SURVEY OF CANADA STATION NUMBERS FOR DATA USED IN STUDY

02GA037 - SCHNEIDER CREEK AT KITCHENER
02GA038 - NITH RIVER ABOVE NITHBURG
02GA039 - CONESTOGO RIVER ABOVE DRAYTON
02GA040 - SPEED RIVER NEAR ARMSTRONG MILLS
02GB001 - GRAND RIVER AT BRANTFORD (1948-79)
02GB001 - GRAND RIVER AT BRANTFORD (1948-82)
02GB002 - GRAND RIVER AT YORK
02GB006 - HORNER CREEK NEAR PRINCETON
02GB007 - FAIRCHILD CREEK NEAR BRANTFORD
02GB008 - WHITEMANS CREEK NEAR MOUNT VERNON
02GB009 - KENNY CREEK NEAR BURFORD
02GB010 - MCKENZIE CREEK NEAR CALEDONIA
02GB011 - MOUNT PLEASANT CREEK NEAR BURTCH
02GC002 - KETTLE CREEK AT ST. THOMAS
02GC004 - BIG OTTER CREEK NEAR VIENNA
02GC005 - NORTH CREEK AT DELHI
02GC006 - BIG CREEK NEAR DELHI
02GC007 - BIG CREEK NEAR WALSINGHAM
02GC008 - LYNN RIVER AT SIMCOE
02GC010 - BIG OTTER CREEK AT TILLSONBURG
02GC011 - BIG CREEK NEAR KELVIN
02GC012 - PATTERSON CREEK NEAR SIMCOE
02GC013 - DEDRICK CREEK NEAR PORT ROWAN
02GC014 - YOUNG CREEK NEAR VITTORIA
02GC015 - LITTLE OTTER CREEK NEAR STRAFFORDVILLE
02GC016 - SOUTH OTTER CREEK NEAR PORT BURWELL
02GC017 - BIG OTTER CREEK ABOVE OTTERVILLE
02GC018 - CATFISH CREEK NEAR SPARTA
02GC021 - VENISON CREEK NEAR WALSINGHAM
02GC022 - HANTICOKE CREEK AT HANTICOKE
02GC023 - FISHERS CREEK NEAR FISHERS GLEN
02GC024 - SILVER CREEK NEAR COPENHAGEN
02GC025 - HEMLOCK CREEK NEAR PORT BURWELL
02GC026 - BIG OTTER CREEK NEAR CALTON
02GC202 - VENISON CREEK NEAR SOUTH MIDDLETON
02GC203 - VENISON CK. TRIBUTARY NEAR SOUTH MIDDLE
02GD001 - THAMES RIVER NEAR EALING (1916-66)
02GD001 - THAMES RIVER NEAR EALING (1967-82)
02GD003 - NORTH THAMES RIVER
BELOW FANSHAWE DAM (1916-44)
02GD003 - NORTH THAMES RIVER
BELOW FANSHAWE DAM (1954-82)
02GD004 - MIDDLE THAMES RIVER AT THAMESFORD
02GD005 - NORTH THAMES RIVER AT ST. MARY'S
02GD006 - THAMES RIVER NEAR INGERSOLL
02GD007 - NORTH THAMES RIVER AT LONDON
02GD008 - MEDWAY RIVER AT LONDON
02GD009 - TROUT CREEK NEAR ST. MARY'S (1946-64)
02GD009 - TROUT CREEK NEAR ST. MARY'S (1965-82)
02GD010 - FISH CREEK NEAR PROSPECT HILL
02GD011 - CEDAR CREEK AT WOODSTOCK
02GD012 - THAMES RIVER AT WOODSTOCK (1952-64)
02GD012 - THAMES RIVER AT WOODSTOCK (1966-82)
02GD013 - WYE CREEK NEAR THORNDALE
02GD014 - NORTH THAMES RIVER NEAR MITCHELL
02GD015 - NORTH THAMES RIVER NEAR THORNDALE
02GD016 - THAMES RIVER AT INGERSOLL
02GD018 - AVON RIVER BELOW STRATFORD
02GD019 - TROUT CREEK NEAR FAIRVIEW
02GD020 - WAUBUNO CREEK NEAR DORCHESTER
02GE002 - THAMES RIVER AT BYRON
02GE003 - THAMES RIVER AT THAMESVILLE
02GE005 - DINGMAN CREEK BELOW LAMBETH
02GE006 - THAMES RIVER NEAR DUTTON
02GE007 - MCGREGOR CREEK NEAR CHATHAM
02GG002 - SYDENHAM RIVER NEAR ALVINSTON
02GG004 - BEAR CREEK ABOVE WILKESPORT
02GG005 - SYDENHAM RIVER AT STRATHROY
02GG006 - BEAR CREEK NEAR PETROLIA
02GG007 - SYDENHAM RIVER NEAR DRESDEN
02GH001 - STURGEON CREEK NEAR LEAMINGTON
02GH002 - RUSCOM RIVER NEAR RUSCOM STATION
02GH003 - CANARD RIVER NEAR LUKERVILLE
02HA003 - NIAGARA RIVER AT QUEENSTON (1926-54)
02HA003 - NIAGARA RIVER AT QUEENSTON (1955-82)
02HA006 - TWENTY MILE CREEK AT BALLS FALLS
02HA007 - WELLAND RIVER BELOW CAISTOR CORNERS
02HA014 - REDHILL CREEK AT HAMILTON
02HB001 - CREDIT RIVER NEAR CATARACT
02HB002 - CREDIT RIVER AT ERINDALE
02HB004 - EAST OAKVILLE CREEK NEAR ORAGH
02HB005 - OAKVILLE CREEK AT MILTON
02HB008 - CREDIT RIVER WEST BRANCH AT NORVAL
02HB010 - SPENCER CK. AT DUNDAS CROSSING(1961-70)
02HB010 - SPENCER CK. AT DUNDAS CROSSING(1972-82)
02HB011 - BRONTE CREEK NEAR ZIMMERMAN
02HB012 - GRINDSTONE CREEK NEAR ALDERSHOT
02HB013 - CREDIT RIVER NEAR ORANGEVILLE
02HB015 - SPENCER CREEK NEAR WESTOVER
02HB016 - BRONTE CREEK AT PROGRESTON
02HB201 - MIDDLE OAKVILLE CREEK AT HWY. NO. 25
02HB203 - MIDDLE OAKVILLE CREEK AT DRUMQUIN
02HB204 - EAST OAKVILLE CREEK AT DRUMQUIN

02HC002 - ETOBICOKE CREEK NEAR SUMMERVILLE
02HC003 - HUMBER RIVER AT WESTON
02HC004 - LITTLE DON RIVER NEAR LANSING
02HC005 - DON RIVER AT YORK MILLS
02HC006 - DUFFINS CREEK AT PICKERING
02HC009 - EAST HUMBER RIVER NEAR PINE GROVE
02HC011 - HUMBER RIVER AT WOODBRIDGE
02HC012 - HUMBER RIVER NEAR CEDAR MILLS
02HC013 - HIGHLAND CREEK NEAR WEST HILL
02HC015 - ROUGE RIVER AT ROUGE HILL
02HC017 - ETOBICOKE CREEK AT BRAMPTON
02HC018 - LYNDE CREEK NEAR WHITBY
02HC019 - DUFFINS CREEK ABOVE PICKERING
02HC022 - ROUGE RIVER NEAR MARKHAM
02HC023 - COLD CREEK NEAR BOLTON
02HC024 - DON RIVER AT TODMORDEN
02HC025 - HUMBER RIVER AT ELDER MILDS
02HC026 - WEST DUFFINS CREEK AT GREEN RIVER
02HC027 - BLACK CREEK NEAR WESTON
02HC028 - LITTLE ROUGE CREEK NEAR LOCUST HILL
02HC029 - LITTLE DON RIVER AT DON MILLS
02HC029 - LITTLE DON RIVER AT DON MILLS/LANSING
02HC030 - ETOBICOKE CK. BELOW QUEEN ELIZABETH HWY.
02HC031 - WEST HUMBER RIVER AT HIGHWAY NO.7
02HC032 - EAST HUMBER RIVER AT KING CREEK
02HC033 - MIMICO CREEK AT ISLINGTON
02HC034 - WEST HUMBER RIVER BELOW CLAIREVILLE DAM
02HC035 - STOUFFVILLE CREEK BELOW STOUFFVILLE
02HC038 - WEST DUFFINS CREEK ABOVE GREEN RIVER
02HC039 - REESOR CREEK ABOVE GREEN RIVER
02HC041 - WEST DUFFINS CREEK NEAR ALTONA
02HC045 - MICHELL CREEK BELOW CLAREMONT
02HC046 - WIXON CREEK BELOW ALTONA
02HD002 - GANARASKA RIVER NEAR DALE
02HD003 - GANARASKA RIVER NEAR OSACA
02HD004 - NORTH WEST GANARASKA RIVER NEAR OSACA
02HD006 - BOWMANVILLE CREEK AT BOWMANVILLE
02HD007 - SOPER CREEK AT BOWMANVILLE
02HD008 - OSHAWA CREEK AT OSHAWA
02HD009 - WILMOT CREEK NEAR NEWCASTLE
02HD010 - SHELTER VALLEY BROOK NEAR GRAFTON
02HD012 - GANARASKA RIVER ABOVE DALE
02HD211 - BOWMANVILLE CREEK NEAR ENFIELD
02HD212 - BOWMANVILLE CK. NEAR ENNISKILLEN
02HD214 - BOWMANVILLE CK. (TYRONE TRIB.)
NEAR HAMPTON
02HD214 - BOWMANVILLE CK. (HAYDON TRIB.)
NEAR HAMPTON
02HD221 - SOPER CREEK NEAR TYRONE
02HD222 - MACKIE CREEK NEAR STEPHENS GULCH
02HD223 - SOPER CKEEK NEAR STEPHENS GULCH
02HD224 - SOPER CKEEK TRIB. NEAR BOWMANVILLE
02HD231 - WILMOT CREEK NEAR LESKARD
02HD232 - WILMOT CREEK NEAR KIRBY
02HD233 - STALKER CREEK NEAR ORONO
02HD234 - ORONO CREEK NEAR ORONO
02HE001 - BLOOMFIELD CREEK AT BLOOMFIELD
02HE002 - CONSECON CREEK AT ALLISONVILLE
02HE003 - DEMORESTVILLE CREEK AT DEMORESTVILLE
02HF002 - GULL RIVER AT NORLAND
02HF003 - BURNT RIVER NEAR BURNT RIVER
02HF004 - BOB CREEK NEAR MINDEN
02HH001 - EELS CREEK BELOW APSLEY
02HH002 - MISSISSAGUA RIVER BELOW MISSISSAGUA L.
02HJ001 - JACKSONS CREEK AT PETERBOROUGH
02HJ002 - OTONABEE RIVER AT LAKEFIELD
02HJ003 - OUSE RIVER NEAR WESTWOOD
02HK002 - TRENT RIVER AT HEALEY FALLS
02HK003 - CROWE RIVER AT HARMORA
02HK004 - TRENT RIVER AT GLEN ROSS
02HK005 - CROWE RIVER NEAR GLEN ALDA
02HK006 - BEAVER CREEK NEAR HARMORA
02HL001 - MOIRA RIVER NEAR FOXBORO
02HL003 - BLACK RIVER NEAR ACTINOLITE
02HL004 - SKOOTAMATTA RIVER NEAR ACTINOLITE
02HL005 - MOIRA RIVER NEAR DELORO
02HL101 - MOIRA RIVER AT TWEED
02HL102 - CLARE RIVER NEAR BOGART
02HL103 - PARKS CREEK NEAR LATTA
02HM001 - NAPANEE RIVER NEAR NAPANEE
02HM002 - DEPOT CREEK AT BELLROCK
02HM003 - SALMON RIVER NEAR SHANNONVILLE
02HM004 - WILTON CREEK NEAR NAPANEE
02HM005 - COLLINS CREEK NEAR KINGSTON
02HM006 - HILLHAVEN CREEK NEAR HILLHEAVEN
02HM007 - NAPANEE RIVER AT CAMDEN EAST
02HM201 - WILTON CREEK AT HARROWSMITH
02JC008 - BLANCHE RIVER ABOVE ENGLEHART
02JC009 - BLANCHE RIVER AT SWASTIKA
02JD004 - MONTREAL RIVER AT ELK LAKE
02JD005 - MONTREAL RIVER AT INDIAN CHUTE PLANT
02JD006 - MONTREAL RIVER AT INDIAN CHUTE
02JD008 - MONTREAL R. AT UPPER NOTCH GEN. STATION

TABLE II.1 LEGEND TO WATER SURVEY OF CANADA STATION NUMBERS FOR DATA USED IN STUDY

Sheet 3 of 3

02JD009 - MONTREAL RIVER AT MOUNTAIN CHUTES
02JD010 - MONTREAL R. AT LOWER NOTCH GEN. STATION
02JD011 - LADY EVELYN RIVER AT LADY EVELYN LAKE
02JD012 - WEST MONTREAL R. AT MISTINIKON LAKE DAM
02JE003 - OTTAWA RIVER NEAR TIMISKAMING
02JE012 - OTTAWA RIVER AT LA CAVE RAPIDS
02JE014 - MATTAWA RIVER NEAR RUTHERGLEN
02JE018 - FARR CREEK AT NORTH COBALT
02JE019 - AMABLE DU FOND RIVER
AT SAMUEL CHAMPLAIN PROVINCIAL PARK
02JE020 - MATTAWA RIVER BELOW BOUILLON LAKE
02JE021 - MATABITCHUAN RIVER AT RABBIT LAKE DAM
02KA002 - OTTAWA RIVER AT DES JOACHIMS
02KA003 - PERCH LAKE OUTLET NEAR CHALK RIVER
02KA004 - PERCH LAKE INLET NO. 1 NEAR CHALK RIVER
02KA005 - PERCH LAKE INLET NO. 2 NEAR CHALK RIVER
02KA006 - PERCH LAKE INLET NO. 3 NEAR CHALK RIVER
02KA007 - PERCH LAKE INLET NO. 4 NEAR CHALK RIVER
02KA008 - PERCH LAKE INLET NO. 5 NEAR CHALK RIVER
02KB001 - PETAWAWA RIVER NEAR PETAWAWA
02KC009 - BONNECHERE R. NEAR CASTLEFORD (1922-57)
02KC009 - BONNECHERE R. NEAR CASTLEFORD (1966-82)
02KC014 - INDIAN RIVER NEAR PEMBROKE
02KC015 - MUSKRAT RIVER NEAR PEMBROKE
02KD001 - MADAWASKA RIVER AT MADAWASKA
02KD002 - YORK RIVER NEAR BANCROFT
02KD004 - MADAWASKA RIVER AT PALMER RAPIDS
02KD006 - MADAWASKA RIVER AT WHITNEY
02KD007 - MADAWASKA RIVER AT BARK LAKE DAM
02KE002 - MADAWASKA RIVER NEAR ARNPRIOR
02KE003 - MADAWASKA RIVER AT CALABOGIE
02KE005 - MADAWASKA RIVER AT STEWARTVILLE
02KF006 - MISSISSIPPI RIVER AT APPLETON
02KF007 - MISSISSIPPI RIVER AT RAGGED CHUTE
02KF010 - CLYDE RIVER NEAR LANARK
02KF011 - CARP RIVER NEAR KINBURN
02KF012 - INDIAN RIVER NEAR BLAKENEY
02KF013 - CLYDE RIVER AT GORDON RAPIDS
02KF014 - FALL RIVER NEAR FALLBROOK
02LA004 - RIDEAU RIVER AT OTTAWA
02LA005 - RIDEAU RIVER ABOVE SMITHS FALLS
02LA006 - KEMPTVILLE CREEK NEAR KEMPTVILLE
02LA007 - JOCK RIVER NEAR RICHMOND
02LB005 - SOUTH NATION RIVER
NEAR PLANTAGENET SPRINGS (1916-43)
02LB005 - SOUTH NATION RIVER
NEAR PLANTAGENET SPRINGS (1946-82)
02LB006 - CASTOR RIVER AT RUSSELL
02LB007 - SOUTH NATION RIVER AT SPENCERVILLE
02LB008 - BEAR BROOK NEAR BOURGET
02LB009 - SOUTH NATION RIVER AT CHESTERVILLE
02LB012 - EAST BRANCH SCOTCH RIVER
NEAR ST. ISIDORE DE PRESCOTT
02LB013 - SOUTH NATION RIVER AT CASSELMAN
02LB016 - LITTER CASTOR RIVER NEAR EMBRUN
02LB017 - NORTH BRANCH SOUTH NATION NEAR HESKSTON
02LB022 - PAYNE RIVER NEAR BERWICK
02MA001 - LYNDHURST CREEK AT LYNDHURST
02MB005 - ST. LAWERENCE RIVER AT IROQUOIS
02MB006 - LYN CREEK NEAR LYN
02MC001 - RAISIN RIVER NEAR WILLIAMSTOWN
02MC002 - ST. LAWERENCE RIVER AT CORNWALL
04CA002 - SEVERN R. AT OUTLET OF MUSKRAT DAM LAKE
04CA003 - ROSEBERRY RIVER ABOVE ROSEBERRY LAKES
04CA004 - SEVERN RIVER BELOW OUTLET OF DEER LAKE
04CB001 - WINDIGO RIVER ABOVE MUSKRAT DAM LAKE
04CC001 - SEVERN RIVER AT LIMESTONE RAPIDS
04CD001 - SACHIGO RIVER BELOW BEAVESTONE RIVER
04CD002 - SACHIGO R. BELOW OUTLET OF SACHIGO LAKE
04CE002 - FAWN RIVER BELOW BIG TROUT LAKE
04DA001 - PIPESTONE RIVER AT KARL LAKE
04DA002 - WINISK RIVER AT KANUCHUAN RAPIDS
04DB001 - ASHEWEIG RIVER AT STRAIGHT LAKE
04DB002 - ASHEWEIG RIVER ABOVE LONG DOG LAKE
04DC001 - WINISK R. BELOW ASHEWEIG R. TRIBUTARY
04DC002 - SHAMATTAWA R. AT OUTLET OF SHAMATTAWA L
04EA001 - EKWAN RIVER BELOW NORTH WASHAGAMI RIVER
04FA001 - OTOSKWIN RIVER BELOW BADESDAWA LAKE
04FA002 - KAWINOGAMS RIVER NEAR PICKLE CROW
04FA003 - PINEIMUTA RIVER AT EYES LAKE
04FB001 - ATTAWAPISKAT R. BELOW ATTAWAPISKAT LAKE
04FC001 - ATTAWAPISKAT RIVER BELOW MUKETEI RIVER
04GA002 - CAT RIVER BELOW WESLEYAN LAKE
04GA003 - PASHKOKAGAN R. AT OUTLET PASHKOKAGAN L.
04GB004 - OGOKI RIVER ABOVE WHITECLAY LAKE
04GB005 - BRIGHTSAND RIVER AT HOBERLEY
04GC002 - ALBANY RIVER BELOW ACHAPI LAKE
04GD001 - ALBANY RIVER ABOVE MOTTIK ISLAND
04HA001 - ALBANY RIVER NEAR HAT ISLAND
04JA002 - KABINAKAGAMI RIVER AT HIGHWAY NO. 11
04JC002 - NAGAGAMI RIVER AT HIGHWAY NO. 11
04JC003 - SHEKAK RIVER AT HIGHWAY NO.11
04JD002 - KENOGAMI R. AT KENOGAMI DAM (1939-64)
04JD002 - KENOGAMI R. AT KENOGAMI DAM (1966-80)
04JD005 - PAGWACHUAN RIVER AT HIGHWAY NO. 11
04JF001 - LITTLE CURRENT RIVER AT PERCY LAKE
04JG001 - KENOGAMI RIVER NEAR MANNAHATTAWA
04KA001 - KWATABOAHEGAN RIVER NEAR THE MOUTH
04LA002 - MATTAGAMI RIVER NEAR TIMMINS
04LB001 - MATTAGAMI RIVER AT SMOOTH ROCK FALLS
04LC001 - GROUNDHOG RIVER AT HORWOOD LAKE
04LD001 - GROUNDHOG RIVER AT FAUQUIER
04LF001 - KAPUSKASING RIVER AT KAPUSKASING
04LG001 - MATTAGAMI RIVER AT SMOKY FALLS
04LG001 - MATTAGAMI RIVER AT SMOKY FALLS/
LITTLE LONG RAPIDS (COMBINED)
04LG002 - MOOSE RIVER AT MOOSE RIVER
04LG003 - MATTAGAMI RIVER AT LITTLE LONG RAPIDS
04LJ001 - MISSINAIBI RIVER AT MATTICE
04LM001 - MISSINAIBI RIVER BELOW WABOOSE RIVER
04MB003 - WATABEAG RIVER AT WATABEAG LAKE DAM
04MC001 - ABITIBI RIVER AT IROQUOIS FALLS
04MC002 - ABITIBI RIVER AT TWIN FALLS
04MD002 - FREDERICK HOUSE R.
AT FREDERICK HOUSE LAKE DAM
04MD004 - PORCUPINE RIVER AT HOYLE
04ME001 - ABITIBI RIVER AT ISLAND FALLS
04ME002 - ABITIBI RIVER AT ABITIBI CANYON
04ME003 - ABITIBI RIVER AT ONAKAWANA
04ME004 - ABITIBI RIVER AT OTTER RAPIDS
04MF001 - NORTH FRENCH RIVER NEAR THE MOUTH
05PA006 - MAMAKAN RIVER AT OUTLET OF LAC LA CROIX
05PA012 - BASSWOOD RIVER NEAR WINTON
05PB009 - SEINE R. AT STURGEON FALLS GEN. STATION
05PB014 - TURTLE RIVER NEAR MINE CENTRE
05PC010 - STURGEON RIVER NEAR BARWICK
05PC011 - PINEWOOD RIVER NEAR PINEWOOD
05PC016 - LA VALLEE RIVER NEAR DEVLIN
05PC018 - RAINY RIVER AT MANITOU RAPIDS
05PC019 - RAINY RIVER AT FORT FRANCES
05PD022 - NORTHEST TRIB. TO L. 239 NEAR KENORA
05PD024 - LAKE 239 LOWER EAST INLET NEAR KENORA
05PD025 - LAKE 239 UPPER EAST INLET NEAR KENORA
05QA001 - ENGLISH RIVER NEAR SIOUX LOOKOUT
05QA002 - ENGLISH RIVER AT UNFREVILLE
05QA004 - STURGEON RIVER AT MCDOUGALL MILLS
05QC001 - CHUKUNI RIVER NEAR EAR FALLS
05QC003 - TROUTLAKE RIVER BELOW BIG FALLS
05QD002 - WABIGOON RIVER
BELOW RAILWAY BRIDGE NEAR QUIBELL
05QD003 - EAGLE RIVER AT EAGLE RIVER
05QD006 - WABIGOON RIVER NEAR QUIBELL
05QD016 - WABIGOON RIVER AT DRYDEN
05QE005 - ENGLISH RIVER AT CARIBOU FALLS
05QE006 - ENGLISH RIVER AT EAR FALLS (1907-28)
05QE006 - ENGLISH RIVER AT EAR FALLS (1929-82)
05QE007 - ENGLISH RIVER AT MANITOU FALLS
05QE008 - CEDAR RIVER BELOW WABASKANG LAKE
05QE009 - STURGEON R. AT OUTLET OF SALVESEN LAKE

TABLE II.2

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

SHEET 1 OF 12

(SEE SHEET 12 FOR LEGEND TO SYMBOLS USED IN TABLE)

STATION NAME	U.S.C. NO.	PERIOD OF RECORD AND NOTES ON DATA USED	NOTES
		1910 1920 1930 1940 1950 1960 1970 1980	
- ABITIBI RIVER AT ABITIBI CANYON	-04ME002		R3
- ABITIBI RIVER AT IROQUOIS FALLS	-04MC001		L R3
- ABITIBI RIVER AT ISLAND FALLS	-04ME001		L R3
- ABITIBI RIVER AT OWAKAWANA	-04ME003		R3
- ABITIBI RIVER AT OTTER RAPIDS	-04ME004		H R3
- ABITIBI RIVER AT TWIN FALLS	-04MC002		R4
- ALBANY RIVER ABOVE HOTTIK ISLAND	-04GD001		D H R4
- ALBANY RIVER BELOW ACHAPI LAKE	-04GC002		H R4
- ALBANY RIVER NEAR HAT ISLAND	-04HA001		R3
- ALDER CREEK NEAR NEW DUNDEE	-02GA030		R1
- AMABLE DU FOND RIVER AT SAMUEL CHAMPLAIN PROVINCIAL PARK	-02JE019		R3
- ASHEWEIG RIVER ABOVE LONG DOG LAKE	-04DB002		M
- ASHEWEIG RIVER AT STRAIGHT LAKE	-04DB001		D M
- ATTAWAPISKAT R. BELOW ATTAWAPISKAT LAKE	-04FB001		L M
- ATTAWAPISKAT RIVER BELOW MUKETEI RIVER	-04FC001		D M
- AUSABLE RIVER NEAR SPRINGBANK	-02FF002		L M
- AUX SABLES RIVER AT MASSEY	-02CE002		R2
- AVON RIVER BELOW STRATFORD	-02GD018		R2
- BAILEY CREEK NEAR BEETON	-02ED004		L R1
- BASSWOOD RIVER NEAR WINTON	-05PA012		L R2
- BATCHAWANA RIVER NEAR BATCHAWANA	-02BF001		M
- BAYFIELD RIVER NEAR VARNA	-02FF007		M
- BEAR BROOK NEAR BOURGET	-02LB008		M M
- BEAR CREEK ABOVE WILKESPORT	-02GG004		M
- BEAR CREEK NEAR PETROLIA	-02GG006		M
- BEAVER CREEK NEAR MARMORA	-02HK006		F R
- BEAVER RIVER ABOVE EUGENIA POWER HOUSE	-02FB001		R3
- BEAVER RIVER NEAR CLARKSBURG	-02FB009		L R3
- BEAVER RIVER NEAR KIMBERLEY	-02FB003		R3
- BEAVERTON RIVER NEAR BEAVERTON	-02EC011		L M
- BEETON CREEK NEAR TOTTENHAM	-02ED100		R2
- BENNET CREEK AT SAULT STE. MARIE	-02BF003		< M
- BIG CREEK NEAR DELHI	-02GC006		R2
- BIG CREEK NEAR KELVIN	-02GC011		L R1
- BIG CREEK NEAR WALSINGHAM	-02GC007		H R1
- BIG OTTER CREEK ABOVE OTTERVILLE	-02GC017		R2
- BIG OTTER CREEK AT TILLSONBURG	-02GC010		R2
- BIG OTTER CREEK NEAR CALTON	-02GC026		< M
- BIG OTTER CREEK NEAR VIENNA	-02GC004		R1
- BIGHEAD RIVER NEAR SEAFORD	-02FB010		L R1
- BLACK CREEK NEAR WESTON	-02HC027		D M
- BLACK RIVER AT BALDWIN	-02EC008		< R
- BLACK RIVER AT SUTTON	-02EC012		R2
- BLACK RIVER NEAR ACTINOLITE	-02HL003		D R3
- BLACK RIVER NEAR MARATHON	-02BB002		L M
		1910 1920 1930 1940 1950 1960 1970 1980	NOTES

TABLE II.2

SHEET 2 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

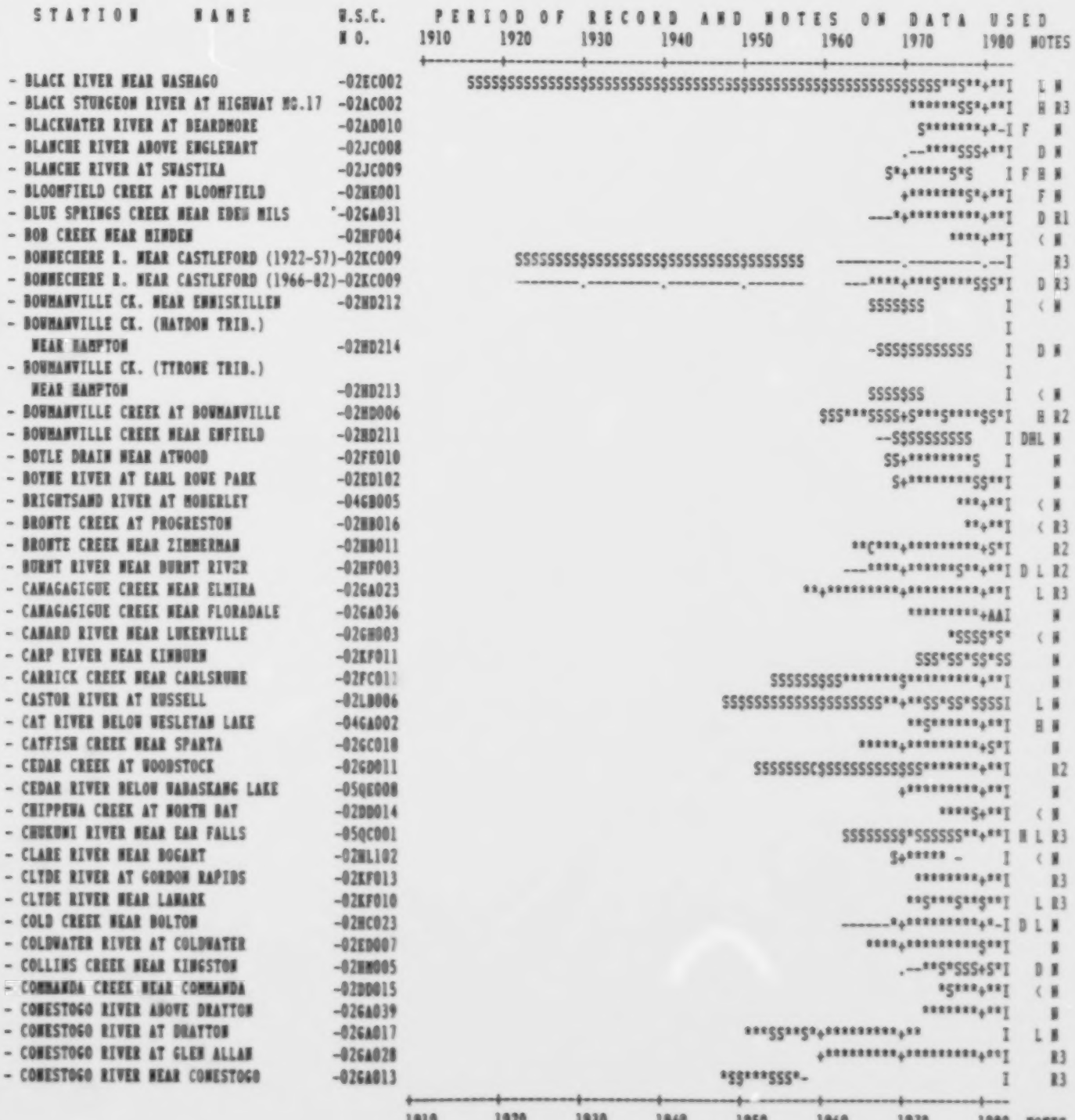

TABLE II.2

SHEET 3 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

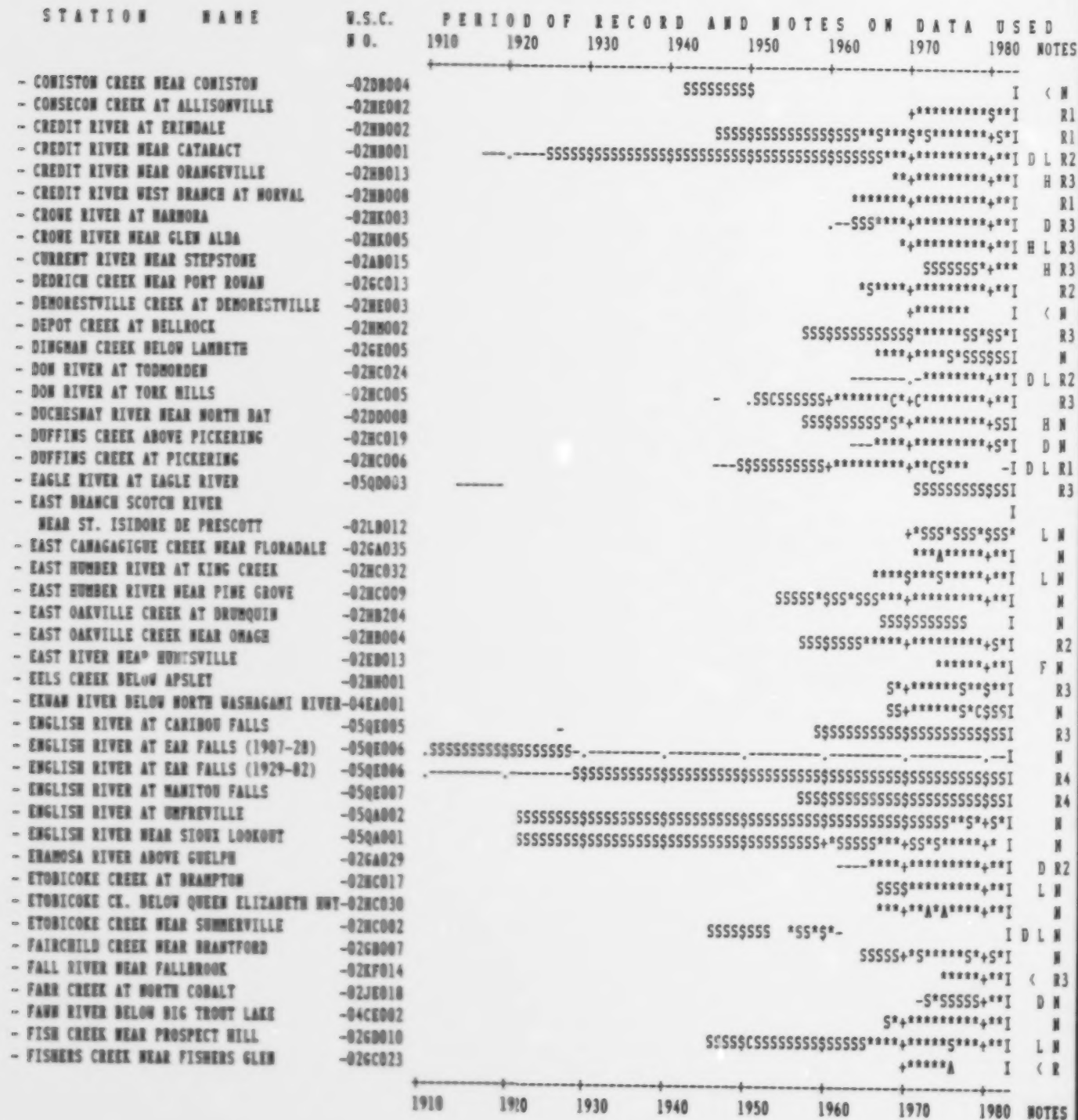

TABLE II.2

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

SHEET 4 OF 12

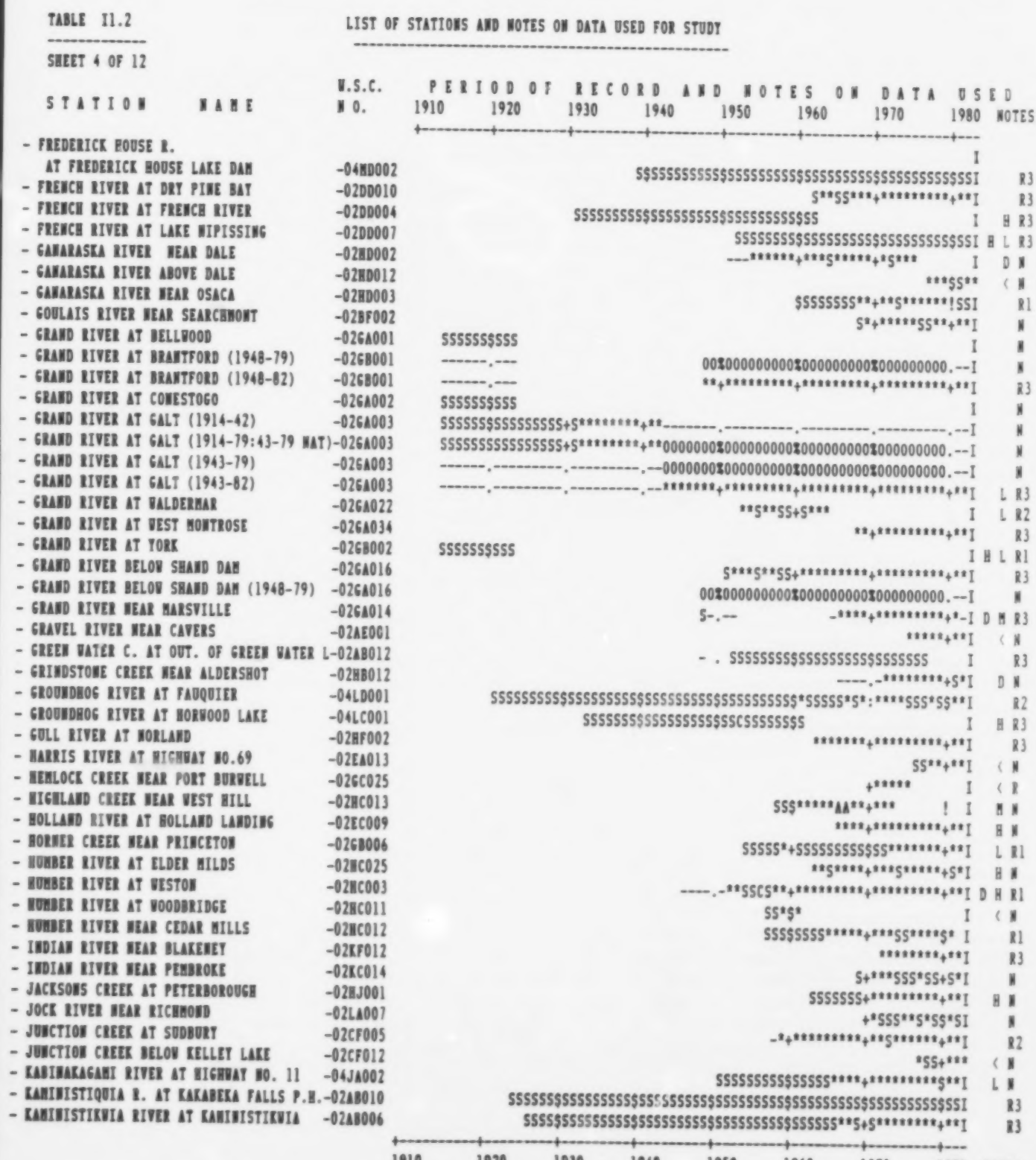

TABLE II.2

SHEET 5 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

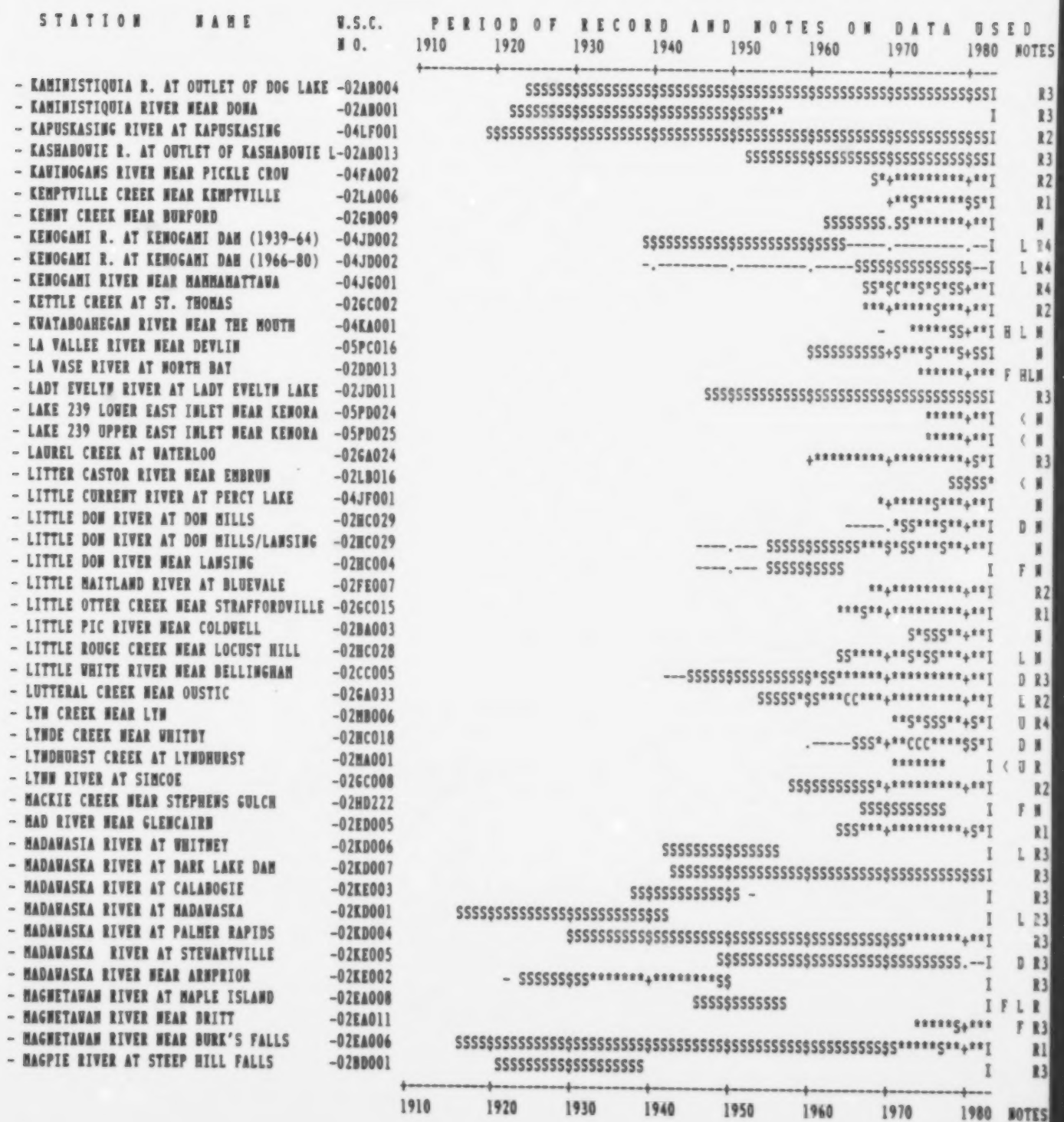

TABLE II.2

SHEET 6 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

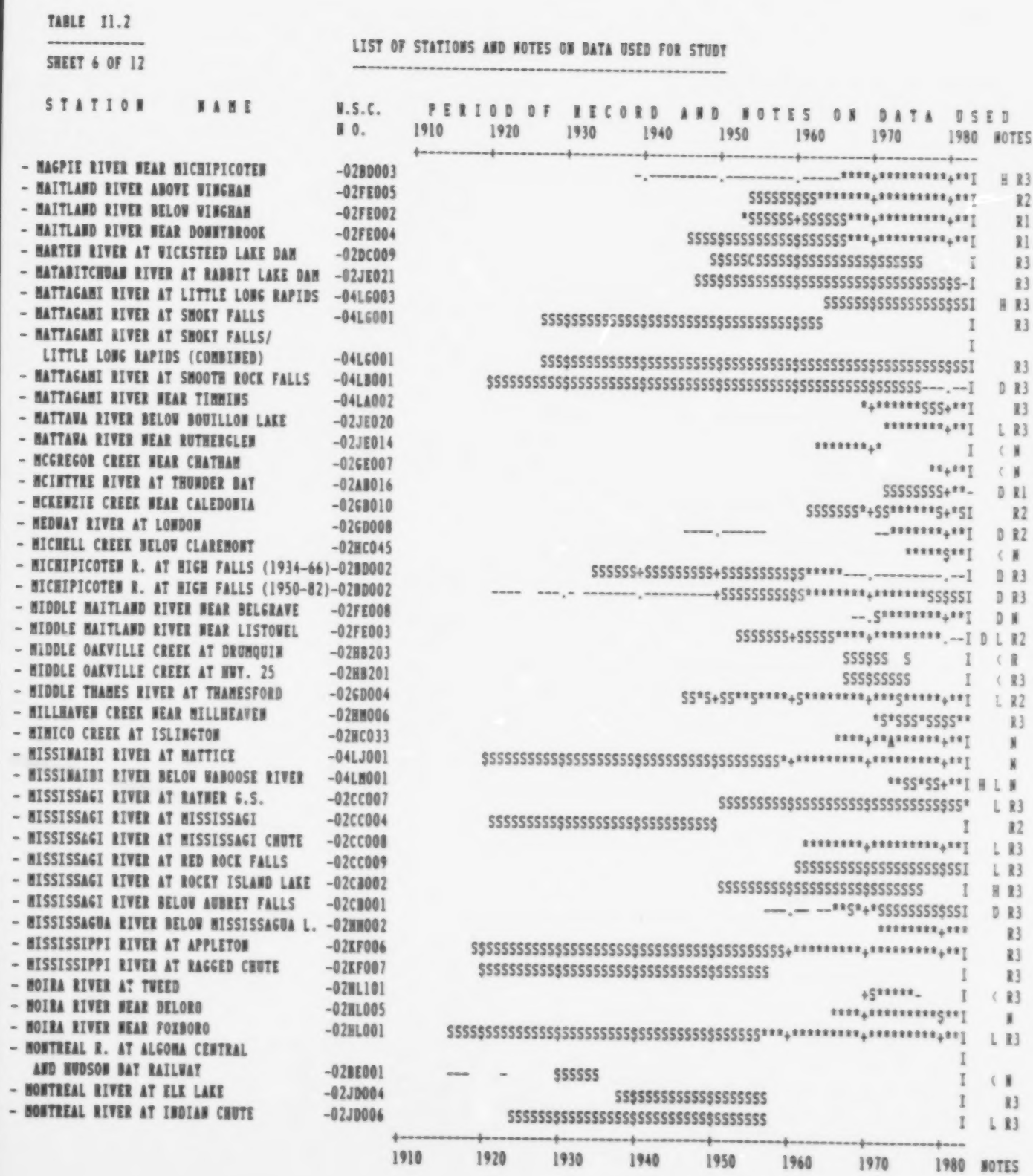

TABLE II.2

SHEET 7 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

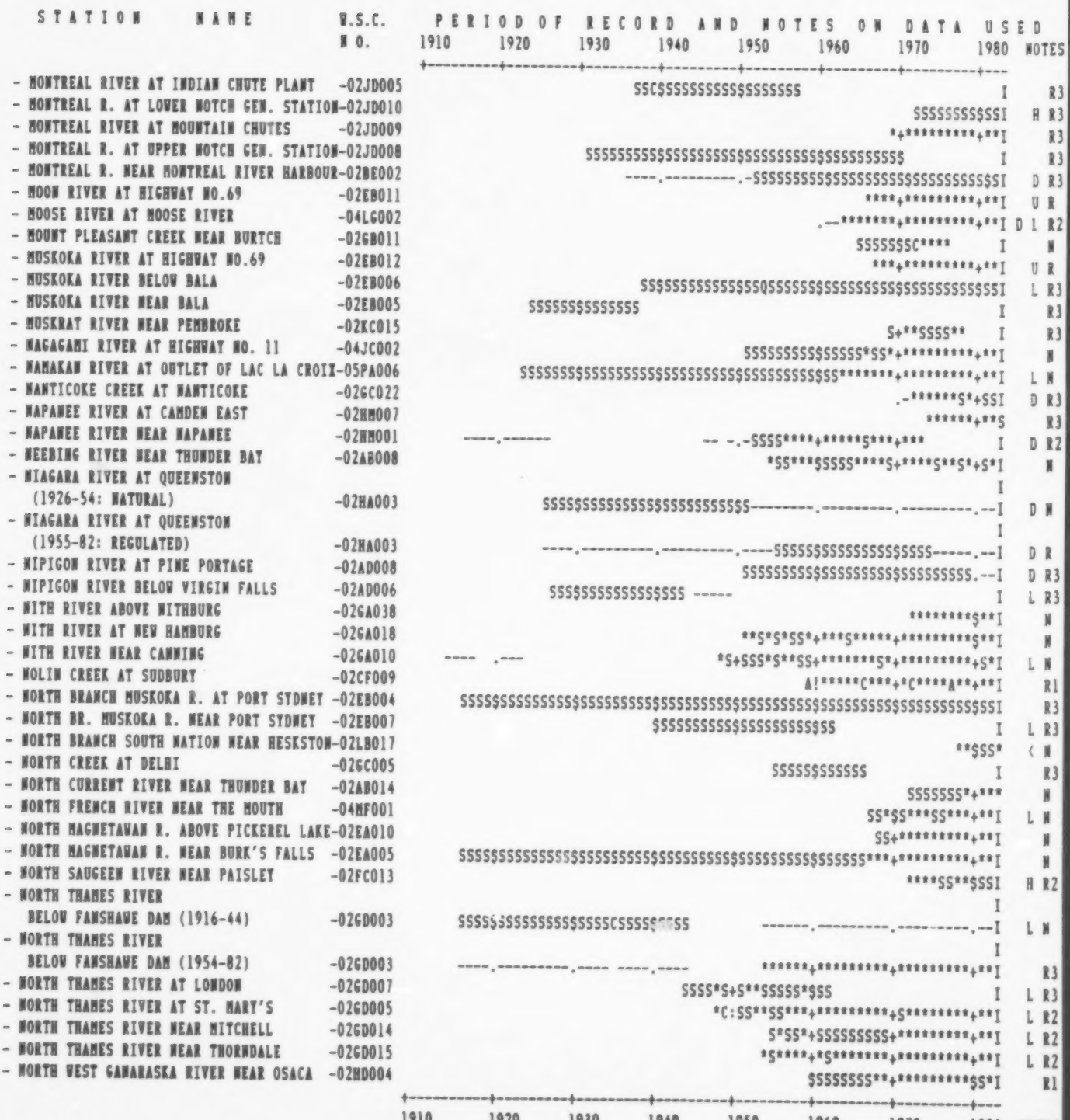

TABLE II.2

SHEET 8 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

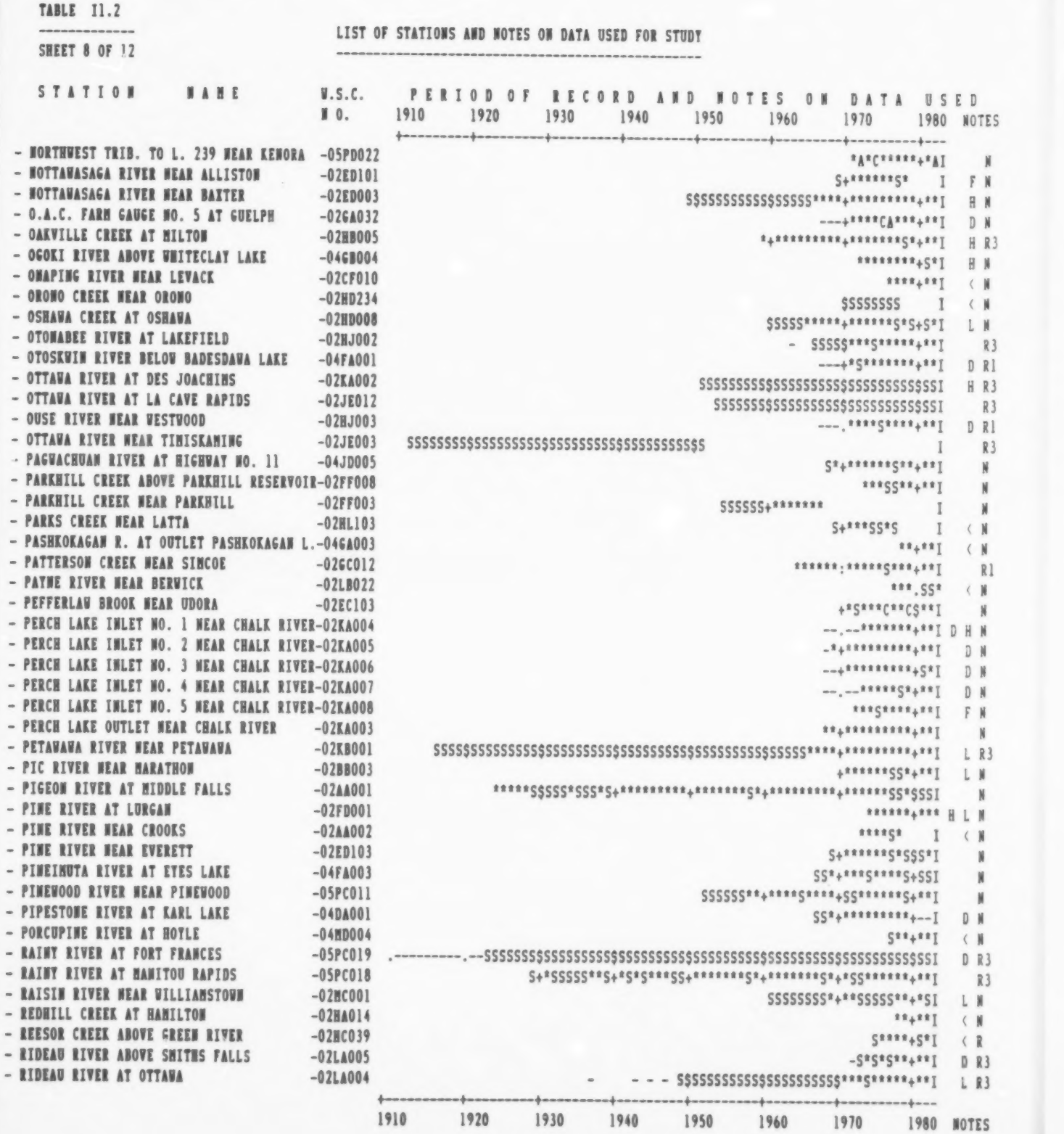

TABLE II.2

SHEET 9 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

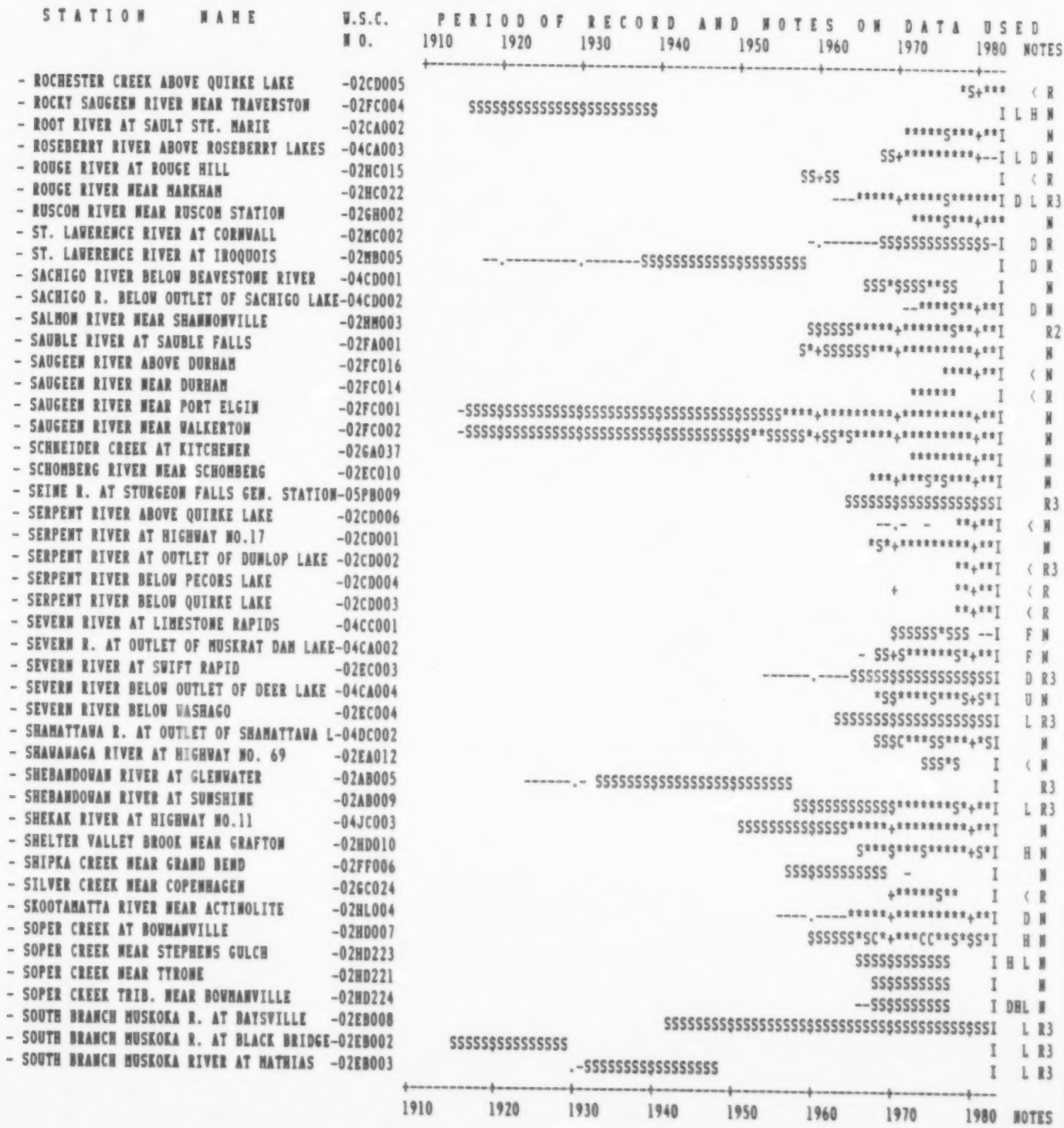

TABLE II.2

SHEET 10 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

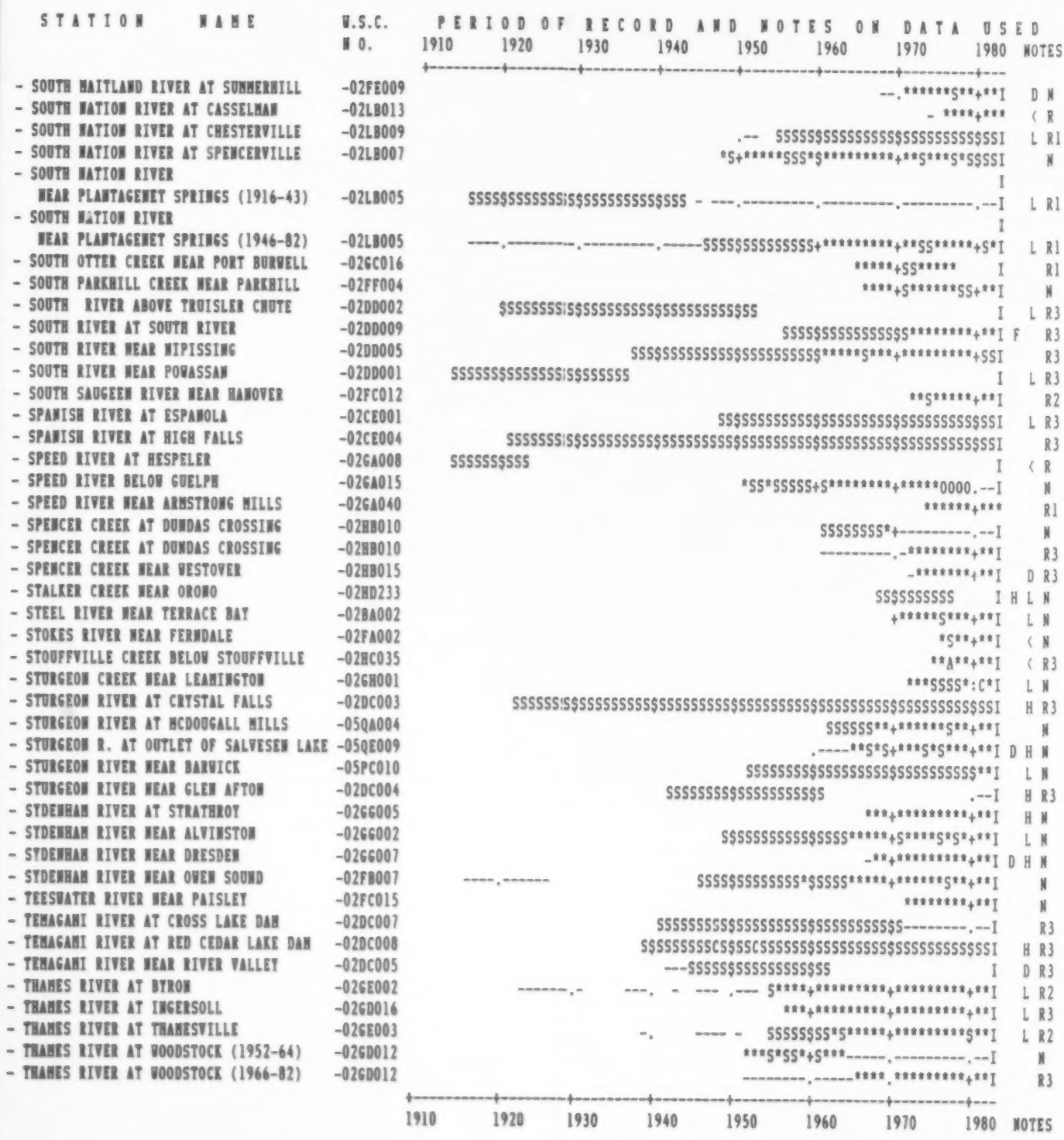

TABLE II.2

SHEET 11 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

TABLE II.2

SHEET 12 OF 12

LIST OF STATIONS AND NOTES ON DATA USED FOR STUDY

STATION NAME	W.S.C. NO.	PERIOD OF RECORD AND NOTES ON DATA USED	NOTES
- WILTON CREEK AT HARROWSMITH	-02HM201	S$$$$$$ I	(N
- WILTON CREEK NEAR NAPANEE	-02HM004	- ---.-***SSSSSS$*I	D H N
- WINDIGO RIVER ABOVE MUSKRAT DAM LAKE	-04CB001	**+*****$***+--I	D L N
- WINISK RIVER AT KANUCHUAN RAPIDS	-04DA002	$$+******* I	N
- WINISK R. BELOW ASHEWEIG R. TRIBUTARY	-04DC001	*$$*$$$$C*$$$*$$ I	L N
- WIXON CREEK BELOW ALTONA	-02HC046	$*****+**I	(N
- WOLF RIVER AT HIGHWAY NO.17	-02AC001	*********+**I	F N
- WYE CREEK NEAR THORNDALE	-02GD013	-- ******+***	F N
- WYE RIVER AT WYEBRIDGE	-02ED011	******+**I	(N
- YORK RIVER NEAR BANCROFT	-02KD002	----.---------.---------$$$$$$$$$$$$$$$$$$$$$$$$$***+*********+**I	D R3
- YOUNG CREEK NEAR VITTORIA	-02GC014	---***+********-.--I	D R2
		1910 1920 1930 1940 1950 1960 1970 1980	NOTES

LEGEND TO DATA SYMBOLS

+/* MAXIMUM INSTANTANEOUS DISCHARGE DATA (MID)
$/S SYNTHESIZED' MID '(USING "SANGAL'S METHOD")
:/C DISCHARGE DATA ESTIMATED BY CORRELATION
!/A AVERAGE RATIO (MID/MD) USED TO SYNTHESIZE 'MID'
./- DATA NOT USED IN 'FFA'
%/0 REGULATED DATA "NATURALIZED" (BY OTHERS)
I TERMINATOR (LOCATED AT DATA YEAR=1983)

LEGEND TO NOTES ON DATA

(ONLY 5-9 YEARS OF USABLE DATA WAS AVAILABLE FOR STATION
D DATA HAD TO BE REMOVED FOR STATION TO PASS ALL "NONPARA" TESTS
F DATA COULD NOT BE MANIPULATED TO PASS ALL "NONPARA" TESTS
H HIGH OUTLIERS WERE DETECTED IN THE DATA SAMPLE
L LOW OUTLIERS WERE DETECTED IN THE DATA SAMPLE
M MAXIMUM FOR PERIOD OF RECORD WAS INCLUDED IN FFA USING PROGRAM "ISTORIC"
N NATURAL DISCHARGES AT STATION
R REGULATED DISCHARGES AT STATION (NO CLASSIFICATION RATING ASSIGNED)
R1 MINOR REGULATION EFFECTS ON DISCHARGES
R2 MODERATE REGULATION EFFECTS ON DISCHARGES
R3 MAJOR REGULATION EFFECTS ON DISCHARGES
R4 DISCHARGES AFFECTED BY MAJOR WATER DIVERSIONS
U UNCERTAIN WATERSHED AREA CONTRIBUTING TO DISCHARGE (FLOW UPSTREAM DIVIDES)